THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XVII. No. 416—20th YEAR.] LONDON, SEPTEMBER 29, 1868. [Subscription per Ann. 15s. in Advance 18s. Credit. Price 6d. Unstamped.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis by Dr. FYFE, M.D.:—
9746 cubic feet of gas per ton of coal.
26-candle gas.
13¼ cwt. coke per ton of coal.
N.B.—Ramsay's Cannel most resembles the Marquis of Lothian's Cannel, but superior as to coke.
RAMSAY'S PATENT CONDENSED COKE,
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1828.
FIRE-BRICK WORKS, established 1804.
FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire Clay.
The Fire Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article.
The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the works are the most extensive in the Kingdom.
Manufactories: DERWENTHAUGH, SWALWELL, and HEBBURN QUAY. Offices: BROAD CHARE, NEWCASTLE-UPON-TYNE. Address, G. H. RAMSAY.

GEORGE GLOVER & CO.,
Patentees of the Standard Gasometers for the Government, and of the
IMPROVED DRY GAS-METERS.
These Meters are warranted to measure correctly and not to vary, and have come into general use more rapidly than any Meters hitherto manufactured.
1862.
CLASSES X. AND XXXI.
CLASS X.—"*For ingenuity, completeness, and efficiency of apparatus used in measuring gas, and for excellence of material and workmanship.*"
CLASS XXXI.—"*For superiority of construction and workmanship.*"
Particulars and lists of prices forwarded on application to Ranelagh Works, Ranelagh Road, Pimlico, LONDON, S.W.; 15, Market Street, MANCHESTER; or 127, Boulevard de Magenta, PARIS.

IMPROVED GASLIGHT.
Ample experience has proved that, by carburetting common gas, its illuminating power may be doubled or even tripled, and its consumpt greatly lessened. Wax candles and oil lamps in consequence are being rapidly superseded, and gas is now used in many private houses and mansions where formerly it was not tolerated.
Information as to the apparatus, fluids, &c., may be had of GEO. GLOVER and CO., or CARLESS, BLAGDEN, and Co., HACKNEY WICK, N.E.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE-CLAY," and they have also been awarded in the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL AND CO.,
THE OLD TUBE WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE;
and 69, UPPER THAMES STREET, LONDON,
Original Manufacturers of Wrought-Iron Gas Tubes and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.
Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.
N.B. All Goods thoroughly Tested before sent out, and Warranted.

JOHN BENT & SON,
WET AND DRY GAS-METER
AND
STREET-LAMP
MANUFACTURERS,
BELL BARN ROAD, BIRMINGHAM.
ESTABLISHED 1830.
All materials found for the alteration of Public Lamps for lighting with the Rod. Regulators with Lava Burners.

BLAYDON BURN AND LOW HENWELL FIRE CLAY RETORT AND FIRE-BRICK WORKS, NEAR NEWCASTLE-ON-TYNE.
WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.
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THE "LOTHIAN" CANNEL COALS.
These Cannels are extensively used in the Gas-Works of Edinburgh, where the illuminating power of the gas is the highest in Britain.
The yield per ton is 12,573 cubic feet; illuminating power 33·8 standard candles: coke per ton 1046 lbs.
Ports of Shipment, in the Firth of Forth.

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These Cannels are used in Glasgow, Greenock, Paisley, and other Gas-Works on the West Coast of Scotland.
The yield per ton is 10,650 cubic feet; illuminating power 34 standard candles; coke per ton 1216 lbs.
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NOTICE.
LESMAHAGO GAS OR CANNEL COAL.
JAMES FERGUSON & CO., Auchinheath COLLIERY, LESMAHAGO, and the NITSHILL & LESMAHAGO COAL COMPANY, AUCHINHEATH AND SOUTHFIELD COLLIERIES, LESMAHAGO, sole Proprietors and Producers of the above celebrated GAS COAL, beg to intimate to Gas Companies and other consumers that, having reason to suspect that Cannel or other Coal of very inferior quality, both as regards the quantity and illuminating power of the Gas, has frequently been mixed with and sold under the name of "Lesmahago," they have now appointed Messrs. JAMES LAWRIE & Co., of 63, Old Broad Street, LONDON, E.C., sole agents for England; and Messrs. LA COUR & WATSON, of LEITH, sole agents for foreign markets; and, in order to prevent a recurrence of the frauds named, they request that all purchasers will send their orders through the above-named firms. Orders for other than the above-named markets may be forwarded direct to either of the Proprietors.
The Proprietors will, in future, use their own forms of bills of lading, and also issue certificates of origin, signed, as the case may be, either by JAMES FERGUSON & Co., or by the NITSHILL & LESMAHAGO COAL COMPANY; and they request all consumers purchasing Lesmahago Coal to demand such a certificate for each cargo, and to observe that it corresponds with the bill of lading.
Auchinheath, Lesmahago, March, 1868.

MEDAL AWARDED, EXHIBITION, 1862, "FOR GOOD WORK."
THE IMPERIAL TUBE COMPANY, BIRMINGHAM,
MANUFACTURERS OF
WROUGHT-IRON TUBES & FITTINGS, BRASS & COPPER TUBES,
GALVANIZED & GLASS ENAMELLED TUBES & FITTINGS,
LAP-WELDED IRON & BRASS BOILER-TUBES, ETC., ETC.
☞ Sole Makers of "HUGHES'S PATENT TAPS," Strongly recommended for all High-pressure purposes.—Price List and Testimonials forwarded on application.

THE UNVARYING WATER-LINE GAS-METER.
(SANDERS & DONOVAN'S PATENT.)
"Unquestionably the best Water Gas-Meter now in use."
MANUFACTURERS:
THE GAS-METER COMPANY, KINGSLAND ROAD, LONDON;
WITH
Branch Manufactories at DUBLIN and OLDHAM.

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The following are taken indiscriminately from a number of testimonials as to the merits of the Fire-Clay and Cast-Iron Ribbed Retorts:—

Gas-Works, Merthyr Tydfil, Sept. 2, 1868.

Sir,—We have had 15 of your Ribbed Clay Retorts in use at these works for the past twelve months. I am happy to be able to report favourably of them. It appears to me that the Ribs afford additional strength to the Retort, whilst they render the charge porous, so that the gas is more freely disengaged from the coal, and the deposit of carbon does not take place to the same extent that it does in plain Retorts. I believe the principle of construction applied to your Retorts may be adopted for Fire-Brick Retorts and Ovens, and with results equally beneficial.—I am, sir, yours faithfully, J. L. Cocker, General Manager.

Leighton Buzzard Gas and Coke Company, Sept. 21, 1868.

Dear Sir,—The first three Patent Retorts I received from you have just now been replaced, after three years wear. We use none but Iron Retorts here, and since 1865 your Patent Retorts have been used exclusively to replace the old ones when worn out. I have four sets of five Retorts each, and one set of two, and find them most durable, and consequently the cheapest in the end. I believe one trial will convince those who use Iron Retorts that your patent ones are the best in use at the present time.—Yours truly,

A. C. Fraser, Esq. W. Mellor.

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Before purchasing send for

GRIFFITHS' MONTHLY LIST OF SAFES,

By Milner, Marr, Thos. Perry and Sons, Mordan, Price, Whitfield, and every eminent maker, at about half the price of new.

A guarantee given with each.

A large quantity of TANN'S SAFES from £2 10s.

Apply to Griffiths, 43, Cannon Street, E.C.

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RETORT SETTER,

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Fire-Clay and Iron Retorts, Double and Single Grooved Brick Retorts, of every description.

Bentley's Improved D Brick Segment Retorts, 5 or 3 in one bed.

Testimonials and references on application.

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FRODINGHAM IRONSTONE MINES,

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BRIGG, LINCOLNSHIRE.

Gas Companies can be supplied from these Mines with OXIDE of IRON, for the purification of Gas, on reasonable terms, and in any quantity that may be required.

This material is a natural Oxide, and is supplied to Gas Companies as taken from the Mines, without any admixture of deleterious matter. It acts freely, and will purify a much larger quantity of gas per ton, than the generality of the material now in use under this name.

It will be found highly beneficial in large establishments, where they are liable to be called upon occasionally to make a much greater quantity of gas than usual, as well as in small establishments where they are limited in space, as by its adoption a much larger quantity of gas can in much less time be purified with the same quantity of material.

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WOOD SIEVES FOR GAS PURIFIERS.

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The above Sieves are used by the principal Gas Companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.

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RETORT SETTINGS, heated by tar without the production of smoke.

STEAM-ENGINES and EXHAUSTERS, separately or combined.

FOUR-WAY VALVES, one of which is equal to three ordinary Valves.

STATION GOVERNORS—the Gasholder cannot tilt and cause accident.

BREEZE AND TAR FUEL MACHINE.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.

N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

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MANN'S IMPROVED SCRUBBER.

See Description and Sketch in "JOURNAL OF GAS LIGHTING," March 31, 1868.

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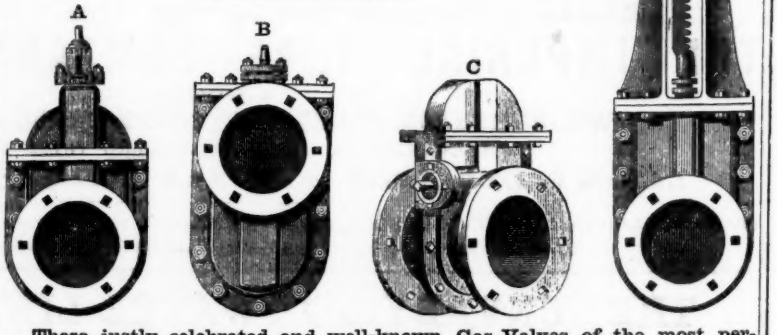
C. & W. WALKERS'

WEDGE GAS-VALVES.



These justly celebrated and well-known Gas-Valves of the most perfect workmanship and construction are made at as low a price as any other kind.

A—Above-ground Screw Gas-Valve, with improved indicator to show when open and shut, is the best kind of Valve for heavy pressures, such as the oxide of iron purification.

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C—Internal Rack Gas-Valve, with wrought-iron pinions.

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GAS-METER MANUFACTURERS.

STATION-METERS ANY SIZE.

PHOTOMETERS, EXPERIMENTAL METERS,

PRESSURE-GAUGES, &c.

Price List on application.

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INTERNATIONAL EXHIBITION,

1862. CLASS X.

PRIZE MEDAL

For excellence of Fire-Clay Gas Retorts, and "HONOURABLE MENTION" for good quality of Fire-Bricks.

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DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for

GAS AND WATER WORKS.

HANCOCK'S INDIA-RUBBER GAS-TUBING.

All sizes, from ¼ in. to 4 in. diameter and upwards.

Also,

HORSE SINGEING APPARATUS, best make, with GAS-BURNERS, COMBS, and INDIA-RUBBER TUBING, all complete.

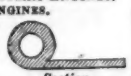
INDIA-RUBBER BAGS for GAS-MAINS.

WASHERS for GAS and STEAM JOINTS.

VALVES (pure solid Rubber) for STEAM-ENGINES.

PACKING (Elastic) for STEAM-ENGINES.

FLANGE TUBING, for excluding Draughts and Dust through WINDOWS, DOORS, and GLASS CASES.



Section.

Illustrated Price Lists on application.

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Vulcanized India-Rubber Works,

GOSWELL MEWS, AND 266, GOSWELL ROAD LONDON, E.C.

Established 1811.

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And every Description of

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LAMP-POSTS—Plain & Ornamental.

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NUMBERS for STREET-LAMPS.

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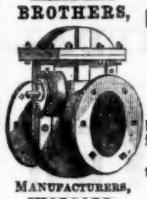

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Valves made with outside racks to order.

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N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

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WILLIAM FRASER, Inverkeithing (owner of the Works at which Fire-clay Retorts were first made), having greatly enlarged his works, can supply retorts and other fire-clay goods to any extent.

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Plans, Specifications, and Estimates prepared.

ADDISON POTTER,

WILLINGTON QUAY,

NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods

THE

UNIVERSAL EXHIBITION OF PARIS,

1867.

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DRY GAS-METER MANUFACTURERS,

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HAVE BEEN AWARDED THE HIGHEST PRIZE FOR

DRY GAS-METERS,

BY THE IMPERIAL COMMISSIONERS FOR THE

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WILLIAM PARKINSON AND CO.

(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

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Established 1816.

PATENT IMPROVED WET METER.

W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sale of Gas Act.

"It is well known that in Meters constructed so that the valve will close when the water is drawn off to such a point as to render them 3 per cent. slow the lights are liable to be extinguished by the closing of the valve by a sudden increase of pressure. To meet this difficulty, Mr. Pinchbeck has invented an ingenious and simple arrangement by which the action is reversed, and any such increase of pressure, in his Meter, raises the value instead of depressing it. The fact of the improvement having been adopted by Messrs. W. Parkinson and Co. is a sufficient guarantee that it practically and effectually remedies the inconvenience it is designed to meet."—JOURNAL OF GAS LIGHTING.

PATENT IMPROVED DRY METER,

Which W. P. and Co. pledge themselves to manufacture with the same quality of materials and workmanship as in their Wet Meter, thereby giving Gas Companies and others the advantage of procuring a first-rate Dry as well as a Wet Meter, which, hitherto, they have been unable to do.

STATION-METERS AND GOVERNORS.

Which can be seen at all the London Gas-Works. Also Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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NOTICES.

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THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 29, 1868.

Notes upon Passing Events.

MR. ROBERT RAWLINSON, C.B., has not, it seems, succeeded in inducing the Walton Board of Health to follow him in the evolution described by an Irish orator as "turning his back on "himself." The plans of Messrs. Reade and Goodison are to be carried out in spite of Mr. Rawlinson's angry opposition. The following resolution was passed at the last meeting of the Walton Board of Health:—"That, as there does not appear "any probability of an agreement being come to between the "West Derby Board and that of this township, for a joint "outlet sewer for the disposal of the sewage of both townships by utilization, the engineers be instructed to modify the "plans so far as to make the outlet sewers applicable for the "township of Walton only, due provision being made in such "altered plans for prospective increase of population."

The City of London School is one of the institutions of which the Corporation of London has most reason to be proud. By the evidence of competent witnesses before the Schools Inquiry Commission, it is a real success—the best day-school in the kingdom. It has, however, one want which is serious, yet easily supplied. The school has no library. Every great school should have a library of a twofold kind. First, a reference library, consisting of the full-sized editions of all the best dictionaries, cyclopædias, and other books of reference in the languages, arts, and sciences which students are likely to require. Many of these should be in duplicate at least, arranged in a room where also a collection of maps and charts should be displayed. The other library should be a lending library, and contain, as fast as they could be collected, standard works in English, French, and German history, biography, travels, fiction, and poetry, to be for the use of all pupils in return for a very moderate subscription. The friends of the school, departing pupils, and pupils who have achieved success, would all be contributors. Their contributions would be assisted by a list of the works, or class of works, most wanted. As respects the City of London School, the foundation of a library would afford Lord Mayor Allen a fine opportunity of wiping out some unpleasant reminiscences. He is a publisher, and can do much at a moderate expense. Messrs. Longmans have never been behindhand on such occasions, and there are other booksellers located in the City who would set or follow a good example. The City of London School Library would be a specimen. The friends of other schools would be apt to follow. One precaution only would be essential—the appointment of a committee to sift the books presented and reject rubbish. There are always people ready to claim a reputation for generosity by giving away what no one would buy.

The benefits of free discussion were never made more evident than at the International Meeting of Working Men at Brussels. All shades of opinions, hostile to existing arrangements, were represented with the most candid simplicity. There was the rough-and-ready British trades unionist, who troubles himself very little with abstract theories, and whose desires are summed up in the familiar rhymes—

> Eight hours of work,
> Eight hours of play,
> Eight hours of sleep,
> And eight shillings a day.

Power to regulate the amount of work per day, and sufficient restrictions on apprentices and handy unapprenticed artisans to keep his trade select, would quite content him, and he would be as indifferent to the condition of the labourers and their sons outside his privileged class as to any theoretical dream of universal equality. A more ambitious and philosophical reformer is the founder of co-operative societies, who proposes to abolish the capitalist by making every calling the subject of an unlimited partnership, in which working men are to get first their wages, and then a share of the profits. He points to the success of the cotton-mills and stores in the Rochdale district, to the league of the stonemasons in Paris, and other working and manufacturing societies. Of course he does not mention the failures that have taken place in such trades as those of tailoring, printing, and hat-making, which at first sight seem so well suited to work out the co-operative principle. Most ambitious of all is what may be called the levelling operative, whose ideal is the suppression not only of all ranks, dignities, and advantages derived from success in life, but the abolition of capital in every concentrated shape. He will not have masters or contractors; he will not have co-operative societies in any shape, because the shareholder would at once imbibe the poisonous sympathies of a capitalist. On the same grounds he objects to frugality, or anything that would lead to one man saving more money than another. Profits and interest on money are alike hateful to him. Railroads, canals, and steamboats are to belong to the State, and be worked for the benefit of the working man, for whom all arrangements are to be made, quite irrespective of that inferior person, the consumer. We were not able to gather from the discussions at Brussels in whom the machinery and the funds needful for carrying on factories were to be vested, or whether the principle of equality was to be varied by the appointment of foremen or other heads of departments. We should like

very much to learn how the system was to be practically applied, as, for instance, in the construction of docks or the management of iron manufactures. Is the man who mixes the mortar and carries the bricks to be paid at the same rate as the man who lays the bricks and turns the arch? On one point only were all the reforming operatives agreed—on the necessity of destroying the tyrant capitalist. With a considerable faith in the application of the co-operative principle, where the co-operators secure able and honest management by those who take practically the place of masters, we still wait to hear from Mr. John Stuart Mill, Mr. Fawcett, Mr. Harrison, Mr. Odgers, or any other of the prominent speakers and writers against the system under which workmen grow into capitalists, how the co-operative system is to be applied where there are no profits, or where there are absolute losses. At Brussels a workman inquired how great speculations were to be commenced if there were to be no profits. He instanced the Atlantic telegraphs and the first railways. He might have found a still more forcible example in Watt's improvement of the steam-engine, on which years of toil and vexation were expended before any satisfactory result was obtained. The first gas-works, the first railway locomotives, might also be cited as examples of results produced by the investments of capitalists looking for good profits on their expenditure. But a more familiar instance will be found in mining industry. There are coal and iron mines which employ at excellent wages large numbers of persons, and now produce great profits to the shareholders, which took years and cost tens of thousands of pounds in wages, machinery, and buildings, before they paid a penny of profit. They are now a benefit to the workmen, who get wages; to the capitalists, who get profits; and to the consumers, who get the coals or iron. How could such works have been undertaken and carried out by an association of workmen alone, dependent on wages, and expecting all profits, if any, to be divided as soon as earned? Workmen may be excused for falling into such mistakes, when educated men, claiming considerable intellectual superiority, are found treating the capitalists who have risked their money in founding and executing docks, canals, water-works, gas-works, and railways, as criminals whose property it would be right to confiscate by taking possession of it at prices to suit the purchaser. When such people lay it down as an incontrovertible axiom that works of public utility should belong to the State, they forget that the State never tries experiments or invents, and if these works had been left to the initiation of the State they would never have been provided for public benefit at all. There never was a more wretched failure, in an engineering point of view, than the railways constructed by the official engineers of France, although they had the advantage of copying, and did servilely copy, the work of our self-taught engineers. Every case for transferring public works to a municipality or a government should be discussed on its own merits, but it will be found as a rule that private enterprise must bring the execution of such works to perfection before non-commercial bodies can satisfactorily take them in hand. It was not a government engineer that devised or a government that patronized Fell's system for uniting the railways of France and Italy, in spite of mountains. What government would have carried a railway from Moorgate Street round London to Cannon Street?

Following in the track of the opponents of private enterprise in public works, a large section of the Brussels congress came to the conclusion that machinery had always been injurious to workmen although useful to consumers, and they proposed to scotch the snake by enacting that in future machinery should be worked for the benefit of workmen alone, as distinguished from capitalists and consumers. The advocates of this compromise between the manufacturing demands of the world and the class interests of handicraftsmen evidently took the same view of machinery that Mr. Edwin Chadwick does of railways and other public works. They take machinery *as it is*, and consider neither the past nor the future. Had hand-weavers been consulted, cotton and other textile machinery had never been used. Had cotton operatives been all-powerful, the improvements for saving labour in minding looms would never have been introduced. The fraternity of blacksmiths would not have supported the wonderful inventions of Whitworth and Roberts, which the mechanical engineers so highly appreciate. The shoemakers of Northampton, quite against the grain, took to the sewing-machine and the pegging-machine, which have given them the command of the market of the world. In fact, under a government of working men alone, no *new* labour-saving machine, no improvement in any existing machine, would have been encouraged, if permitted.

The discussion on property in land, at Brussels, brought out the most curious differences of opinion. All agreed in detestation of the large landed or capitalist proprietor, who flourishes most in England. But, said one party, your peasant proprietor is always poor; generally his little farm is mortgaged; he has no capital for cultivating in the best way; to him the expenses of drainage, and the purchase of good machinery and tools, are impossible; besides, he is ignorant, and led away by the enemies of the town workman; therefore we propose that all land should belong to the State, and be leased only to cultivators. The advocates of this ancient kind of communism forget that the functionaries created to hold and lease the land, manage the railways and steamboats, and take charge of the mines and manufactures, would be an aristocracy much more powerful than now exists, because they would only have one united interest to make the most of their posts. A superintendent of police in a rural district in France can be much more tyrannical and mischievous than the most ill-conditioned duke in England, and he is powerful in proportion as all in his district are poor and helpless. On the other hand, the representatives of the small landowners of France and Belgium were by no means prepared to give up their independence or dependence in order to become the tenants of a government official. At the Brussels congress, England was treated as the country most aristocratic and most hostile to equality—perhaps justly; but it is rather remarkable that England is the country where the working man enjoys the greatest liberty in the disposal of his labour. His trade combinations are free; he can travel and marry even with more liberty than in Switzerland. England was the first country to exclude women from mines, to limit the hours of labour of women and children, and to enforce education in factories. England was also the first country to abolish all the taxes on food and clothing. The taxes on the food of towns, almost universal abroad, did not exist to abolish. This consistent legislation in favour of working men extended over a series of years, and is far in advance of democratic France or paternal Germany. The competition between the landed and the manufacturing classes has evidently been in favour of the working man. We commend these facts to the attention of those philosophers who see in the equality of tyranny and misery of France a full compensation for the want of personal liberty.

The Midland Railway Company is about to open one of the largest, and, it may be presumed, one of the most complete railway stations in London. We note, however, one grave error in the architecture. The great arch of glass is a mistake originated and perpetuated by the Crystal Palace. A glass roof is so acted upon by the alternate expansion and contraction of summer's heat and winter's frosts, that it can only be kept in repair at an enormous and needless expense. It is always difficult and dangerous to repair such a roof. Side lights might look less imposing, but are more convenient in every respect. Having had considerable personal experience, we would say to architects and engineers, "Avoid a glass roof "whenever you can get light from the side."

The General Omnibus Company is in a very unsatisfactory condition—dependent for its dividend on such matters as a shilling more or less in the price of oats. When the dividend of a company whose property is all rolling stock falls below 5 per cent., it cannot be considered in a sound state. The General Omnibus Company has only one prospect of increasing and securing its dividends—that is, to associate itself with a tramway company. Tramways will be carried out in the metropolis sooner or later, against and in opposition to the General Omnibus Company if not in alliance with it. The support of the District Boards of Works should be secured by a royalty on the mileage run. The first tramways should unite the different railway systems and accommodate long lines of traffic—as, for instance, Oxford Street, Kennington to Blackfriars or Waterloo, Highbury to Farringdon Street and King's Cross, if possible. Such a system would take half the omnibuses off the streets, and give double the accommodation at half the working expenses; but the parish interests must be conciliated.

The report of the commissioners appointed to inquire into the state of education in all schools, except those receiving a share of the parliamentary grant, and the nine public schools—

which have been the subject of a separate commission—fills a volume of over five hundred pages, with an appendix of two hundred pages, exclusive of the evidence taken orally. It is not, therefore, possible to analyze it in a few paragraphs. It will, however, be useful to give, by way of commencement, an idea of the conclusions to which the commissioners come, and the grounds of those conclusions. Taken as a whole, the best education now given of the sort is that provided for the working classes in the National, British, and other schools receiving assistance from parliamentary grants, provided with certificated masters and mistresses, and duly inspected—with plenty of room for improvement. This education is the best of its kind. The next best is at the other extreme end—the education provided for those who remain at school until eighteen or nineteen years of age, with the view of proceeding to one of the universities. That is to say, what is professed to be taught is taught to those who are willing to learn; whether the course of study is all that is needed in this country is quite a different question. The most flagrant deficiencies are to be found in the schools provided for the classes just above the labouring class, who complete their education at fourteen or fifteen, and in the schools for the middle class, where pupils remain to seventeen or eighteen, and are not intended to proceed to one of the universities, but to take part in trade, manufactures, or such professions as architect, engineer, solicitor, or general practitioner of medicine. As to funds, England is amply supplied with all that is necessary either to turn existing foundations of large amount, where a sufficient number of pupils can be attracted, to full use, or to devote to one common fund, for educational purposes, a number of small foundations and charities, which are worse than wasted; and, finally, to abolish all local exclusions, or, at any rate, to extend privileges from a parish to a town, and from a town to a whole country. The management of all educational foundations must be placed under the control of a Board of persons specially competent for directing the education of the kingdom. As to what may be done, the canton of Zurich, "with "the population of Leicestershire, maintains a university, a "veterinary school, a school of agriculture, two great classical "schools, two great *real* schools (*i.e.*, not classical, but scien- "tific and commercial), a normal school for training primary "and secondary teachers, fifty-seven secondary schools, and "three hundred and sixty-five primary schools. Many of "these are among the best of their kind in Europe." The commissioners do not propose a servile imitation of either the French, the Prussian, or the Swiss system, all of which they describe in detail, but a complete system of education suited to the character and demands of the English nation. They propose to divide education into three grades, with preparatory schools for each, and exhibitions for enabling poor clever boys to pass from one grade to another. The third grade, which is most urgently required, would carry education up to the age of fourteen or fifteen. "It is here endowed schools signally "fail, and nothing else takes their place. Our industrial "classes have not even that basis of sound general education "on which alone technical instruction can rest." The third-grade school is to be in two divisions, a lower and an upper; the lower division to receive boys at six or seven, and keep them until the age of twelve. At the age of twelve an average boy ought to be able to read with perfect fluency and intelligence any ordinary English book; to have learned a considerable quantity of the best English poetry by heart; to write, not a rapid, but a clear good hand; to be expert in arithmetic, as far as proportion and fractions, and be able to work out arithmetical questions with common sense; also the outlines of geography, physical and political. Boys who could pass an examination to this extent should be promoted to the upper division. In the upper division the same subjects should be continued by reading the best English authors, and the outlines of history should be commenced; also the elements of Latin, or some modern language (according to the rule of the school, as settled by the master and governors). Algebra and practical geometry should be added to arithmetic; and to geography, some branch of natural philosophy. Drawing should be taught. A boy at fourteen ought to be required to quit a school of this grade at the end of the current half year. This rule is necessary, because it is the tendency of all schools to endeavour to retain good scholars as long as they can. As a matter of course, a master gives these elder clever scholars his chief attention, to the neglect of the rest. Those boys who wish to continue their education at fourteen must be required to proceed to schools of the second grade. It might often be desirable to attach these schools of the third grade to the elementary schools which are under the inspection of the Privy Council, so as to admit to the upper division the children of labourers who could pass the examination. Supposing third-grade schools are built, furnished, kept in repair, and warmed, from endowments, the cost of thoroughly efficient teaching is estimated at an average of £4 per head. This sum most parents would willingly pay. Under certain circumstances endowments might be used to reduce, but never to entirely extinguish, the payment of this sum. Schools of the second grade would provide an education intended to cease at about sixteen, and would prepare boys for business, several professions, for manufacture, for the army, and for many departments of the civil service. All but the wealthier gentry would choose such schools if the education were thoroughly good of the kind. These would also include a lower and upper division, and boys entering the lower division at seven or eight ought to be able to spell and read easy English, to know the multiplication table, and to write large hand. The course of instruction would include the subjects of the third-grade school. In addition to Latin, one or two modern languages to be thoroughly well taught. Mathematics should be taught practically as well as scientifically. Algebra, geometry, and trigonometry might be put within the reach of many boys. Practical mechanics, and other branches of natural science, must be a prominent feature of the *curriculum*. In moving, after examination, through the upper division, it should be an absolute rule that the elementary subjects should be kept up; English should be carefully cultivated until the last; every boy should have a good knowledge of a few of the best English authors; arithmetic should never be dropped. The fees for day-schools might vary from £6 to £12, and for boarders, including education, need not rise above £40. We must reserve for the present any further notice of this most important Blue-Book.

GAS LEGISLATION OF 1868.

THE number of Acts relating to the supply of gas passed during the last session of Parliament amounted to little more than one-half those of the preceding session, a much larger proportion than usual of the Bills introduced having been either rejected or withdrawn. The Acts passed only amounted to twenty-four, of which six give further powers to companies previously possessing statutory powers, ten confer parliamentary authority on companies which have been carrying on their works without that protection, three incorporate new companies, and four Acts authorize the transfer of gas-works to local authorities. The most important of all the Acts passed during the last session was the City of London Gas Act, which does not come within any of the foregoing classes, but partakes of the nature of a general Act, as it includes within its operation the three gas companies which supply the City and also the western district of the Chartered Company. No Act for the incorporation of a competing company was passed, though three Bills having that object were introduced in the House of Commons.

The *City of London Gas Act* was so fully noticed during its progress through Parliament, and when finally amended by the committee, that it is unnecessary now to do more than refer to the abstract of it in our JOURNAL on the 26th of May last.

Of the six Acts which confer additional powers on established companies, the first in order is

The *Brentford Gas Act*, which authorizes the company to extend their limits of supply into Norwood, Southall, Harlington, Cranford, East Bedfont, Greenford, and part of the parish of Hayes, but not to interfere with the limits assigned by Parliament to other companies. In addition to their present authorized capital of £229,700, the company may raise £250,300, making the aggregate capital £480,000. The dividends on the whole capital of the company are limited as follow:—On preference shares to 6 per cent.; on ordinary shares to 7 per cent., when the charge for gas exceeds 4s. 6d. per 1000 feet in the old district and 5s. 6d. in the extended district; 8 per cent. when the prices in those districts respectively do not exceed 4s. 6d. and 5s. 6d.; 9 per cent. when they do not exceed 4s. and 5s., and 10 per cent. when the prices do not exceed 3s. 9d. and 4s. 9d. per 1000 feet. The maximum prices fixed are 5s. and 6s. per 1000 feet in the old and the new districts respectively. The standard of illuminating power is 14 candles, and the gas is not to contain more

than 20 grains of sulphur in any form in 100 cubic feet, as indicated by Dr. Letheby's test; but it is provided that the tolerated quantity of sulphur is to be regulated so as to agree with the quantity which may be hereafter prescribed in the metropolis. The pressure is not to be less than six-tenths of an inch of water from midnight to sunset, nor less than eight-tenths from sunset to midnight, the penalty for failure being £10 each day. The charge for gas supplied to the public lamps is not to exceed the lowest rate charged to any consumer other than a railway company. The provisions regulating the rate of dividends according to the price charged for gas, respecting the standard of purity, the pressure of the gas, and the supply of the public lamps, were introduced in the committee on the Bill, and the power required by the company to purchase railway trucks, lighters, coal vessels, and coal mines was not granted.

The *Burslem and Tunstall Act* authorizes the company to raise £50,000 by the issue of shares in addition to the present capital of £28,000, the dividends on the new capital being limited to 7 per cent. Gas is to be supplied to the public lamps at the same rate as to private consumers generally, the quantity supplied being determined by partial meter indication of one meter to every twelfth lamp, unless otherwise agreed, with a pressure-regulator to each. The illuminating power of the gas is to be equal to 13 candles, and it is not to contain more than 5 grains of ammonia nor more than 20 grains of sulphur in 100 feet, when subjected to Dr. Letheby's test, though the gas company and the lighting authority may agree on any other mode of test. The maximum price is fixed at 4s. per 1000 feet, subject to a discount of 12½ per cent. if paid for within two months. There were many alterations made in the original Bill, which proposed an illuminating power of 12 candles, made no provision for public lighting, limited the dividends on the new capital to 7½ instead of 7 per cent., and gave no power to the lighting authority to test the gas.

The *Chartered Company's Act* was noticed so fully in our JOURNAL on the 26th of May, after the Bill had passed through the committee, that it is unnecessary now to do more than state that the company are authorized to raise an additional share capital of £650,000, and to borrow £300,000 on their existing capital of £900,000, and one-fourth of the amount of the new capital, on which there is no limitation of dividends. The City Gas Company are especially authorized to subscribe for £150,000 of the new capital. Power is given to the company to purchase land for a new site for extensive works at Barking Creek, after which are completed the manufacture of gas at the works in Brick Lane and the Curtain Road is to be discontinued. Power is also given to supply gas in bulk to other metropolitan gas companies. The company are to be subject to the same provisions in the western portion of their district, as in that part of their district within the City, prescribed by the City of London Gas Act.

The *Farnworth and Kearsley Act* authorizes an extension of the limits of supply, and an increase of capital from £24,000 to £54,000. The dividends on new shares are limited to 7 per cent. on ordinary, and to 6 per cent. on preference shares, the company being authorized to issue debenture stock. The illuminating power of the gas is to be not less than 14 candles, and it may be tested without notice. No standard of purity nor is any price named. In the Bill the limitation of dividends on new shares was 7½ per cent., and six hours notice was required before testing.

The *Leeds New Gas Company's Act* empowers them to consolidate their capital, to issue additional shares, and to purchase more land. The "original stock" of £45,000, created in 1854, which bears a maximum dividend of 10 per cent., is to be converted into £75,000 stock, bearing interest at the rate of 6 per cent., the remaining portion of their present share capital being limited to that rate, so as to consolidate the share capital into one uniform stock of £192,500, with a maximum dividend of 6 per cent. Power is also given to raise additional share capital of £100,000, with limitation of dividend to 6 per cent. Debenture stock may be issued with interest not exceeding 4½ per cent. Additional land may be purchased, by agreement, not exceeding 10 acres in addition to the 10 acres the company are now authorized to hold. There is nothing in the Act relating to the quality nor to the price of gas, and the only addition to the original Bill is the introduction of a clause exempting incoming tenants from liability to pay arrears of gas-rents.

The *Morley Act* authorizes the company to convert the existing share capital of £7500 into capital stock of the same amount, to capitalize £3600 expended on the works out of profits, and to raise additional share capital to the amount of £35,000. The dividends on the capitalized stock are limited to 5 per cent., and on the additional shares to 7 per cent. The company are authorized to issue debenture stock. The illuminating power of the gas is to be 14 candles, and it may be tested without notice. The maximum price is to be 5s. per 1000 feet. The qualification of directors is raised to £50. The Bill contained no provisions for limiting the dividends on the new capital, nor any respecting the illuminating power and price of gas. No standard of purity is named in the Act.

The ten Acts passed conferring statutory powers on existing companies which had been carrying on their works without parliamentary authority were :—

The *Calverley and Horsforth District Gas Act*, to amalgamate and incorporate the Calverley and Horsforth Gas Companies, which supply adjoining districts in the West Riding of Yorkshire. The former company was established in 1862 and the latter in 1852, and the estimated value of their united capitals, including capitalized profits, is £14,000. The Act authorizes the raising of £36,000 additional share capital, the dividends on which are limited to 7 per cent. The illuminating power of the gas is to be 14 candles, and the maximum price 5s. per 1000 feet. The gas may be tested for illuminating power without notice, the purity not being named. In the Bill there was no limitation of dividends, the illuminating power named was 12 candles, and 24 hours notice was required before testing. The usual clause for the protection of incoming tenants from claims for arrears was introduced.

The *Chichester Gas Act* incorporates a company constituted for the purchase of the works of Mr. Robert Monk Church, who has hitherto supplied the city of Chichester with gas. The capital of the company is to be £18,000, in shares of £10 each, which may be divided into half-shares, one of which halves may be preferred; but if there be not profits available for the full amount of dividend on any preferred half-share, no part of the deficiency is to be made good out of the profits of any subsequent year. Debenture stock may be issued. The number of directors is not to exceed five, and their qualification is to be the possession of 20 shares. The maximum price for 14-candle gas is to be 5s. per 1000 feet, and the gas is not to contain more than 5 grains of ammonia nor more than 20 grains of sulphur in 100 feet, as determined by Dr. Letheby's test, though the company and the Corporation may agree on any other mode of test, or on other proportions of ammonia and sulphur to be tolerated. The gas may be tested without notice at any hour not later than eight o'clock in the evening. The gas is to be supplied to the public lamps, at the lowest price charged to any consumers, by average meter indication, with one meter to every twelfth lamp, and a regulator to each. There were muny alterations made in the Bill by the committee. The price agreed to be paid to Mr. Church by the company was £20,750; but no price is named in the Act, and the proposed capital of £30,000 has been reduced to £18,000. The price of gas was regulated in the Bill by the cost of coals, and there was no standard of purity named; a notice of six hours being also required before testing the illuminating power, which has been raised from 12 to 14 candles.

The *Clevedon Gas Act* authorizes the company, who were established in 1856, to increase their present capital of £8000 by the creation of new shares to the amount of £20,000, the dividends on those shares being limited to 7 per cent. Power is given to issue debenture stock. The number of directors is not to exceed seven, the qualification of a director being ten £10 shares. The price of 14-candle gas is not to exceed 5s. 6d. in Clevedon, and 6s. beyond; the latter price to continue only for 10 years. The gas may be tested at any reasonable hour in the daytime for illuminating power, no standard of purity being named. In the Bill the dividends on the new shares were limited to 8 per cent., the standard of illuminating power was 12 candles, and the general maximum price 6s. per 1000 feet.

The *Cork Gas Act* dissolves and reincorporates the Cork Gas Consumers Company, Limited, established in 1856, and authorizes the company to increase their capital of £120,000 to £150,000, though £24,000 of the existing authorized shares have not been paid up. The dividend on the whole capital of the company, including old and new shares, is limited to 8 per

cent. Power is given to create debenture stock. The number of directors is not to exceed seven, the qualification being 25 shares of £5, and the remuneration of the directors is limited to £700 per annum. The company are empowered to purchase 15 acres of additional land. Gas is to be supplied to the public lamps by partial meter indication, at the rate of one meter to every twelfth lamp, with pressure-regulators to each. The company are to light, extinguish, clean, and repair all public lamps for 15s. per lamp per annum, and they may be required to supply such lamps with 4 cubic feet of gas per hour from sunset to sunrise all the year round at a charge not exceeding £4 per lamp, including the 15s. for lighting, extinguishing, cleaning, and repairing, and the use of lamp-posts, burners, &c. The maximum price for 14-candle gas, including meter-rent, is to be 4s. 9d. per 1000 feet within the lighting district of the Corporation, and 5s. 3d. beyond. The purity of the gas is to be the same as that supplied to London, or as may be hereafter prescribed by any amendment of the Metropolis Gas Act of 1860. The gas may be tested without notice. The Act differs in many respects from the Bill as introduced into Parliament. The number of directors has been reduced from nine to seven, and the clause limiting their remuneration has been introduced. The quantity of additional land required has been reduced from 20 to 15 acres; the provisions respecting the supply of gas to public lamps have also been introduced; the maximum prices have been raised from 4s. 6d. and 5s. per 1000 feet, as inserted in the Bill, to 4s. 9d. and 5s. 3d., but the illuminating power has been raised from 12 to 14 candles; and a proviso, giving the Corporation and the company power to alter the standard of illuminating power from 12 to 16 candles, with an increase of 3d. for every additional candle above 12, has been struck out. In the Bill six hours notice was required before testing.

The *Eastbourne Gas Act* incorporates a company established in 1852, with a nominal capital of £20,000, and confers power to raise £30,000 additional, though £11,500 of the present authorized capital has not been called up. The dividends on the new ordinary shares are limited to 7 per cent., and on preference shares to 6. Debenture stock may be issued. The number of directors is to be nine, and their qualification £100 in shares. The maximum price of 14-candle gas is to be 5s. per 1000 feet, and the gas is not to contain more than 20 grains of sulphur in 100 cubic feet. A notice of six hours is required before testing. The company may purchase by agreement 10 additional acres of land. There is no material difference between the provisions of the Act and the original Bill.

The *Hythe and Sandgate Act* incorporates a company registered in 1856, with a capital of £6660, and authorizes them to raise the total share capital to £24,000. The dividends on the new shares, if issued with preference, are limited to 6 per cent., and on ordinary shares to 7 per cent. Debenture stock may be issued. The number of directors named is six, but they may be reduced to four. The maximum price of 14-candle gas supplied to private consumers is to be 5s. per 1000 feet, and to the public lamps 4s. 6d. The gas is to be tested for sulphuretted hydrogen, and no notice need be given before testing. There is no limit to the quantity of land the company may require to purchase by agreement. The committee on the Bill raised the maximum price of the gas supplied to private consumers from 4s. 6d. to 5s. per 1000 feet, and removed the limitation on the quantity of land to be held, which was 10 acres. There was no limitation of dividends on the new capital named in the Bill. The company sought to be empowered to contract for the lighting of Shorncliffe Camp, but that clause was struck out.

The *Loughborough Gas Act* incorporates a company established in 1836, and authorizes them to raise the original capital of £13,330, consisting partly of profits expended on works, to the amount of £25,000. The original capital is converted into a consolidated stock, with dividends limited to 8 per cent., and the dividends on the additional capital are limited to 7 per cent. on ordinary shares, and to 6 per cent. if issued with preference. The interest on debentures is limited to 5 per cent. The number of directors named is twelve, but it may be reduced to three; the qualification being shares amounting to £50. The maximum price of 14-candle gas is to be 4s. 6d. per 1000 feet, and the public lamps are to be supplied at the lowest rate charged to private consumers. The gas is not to contain more than 20 grains of sulphur in 100 cubic feet, and it may be tested on giving two hours notice. The quantity of land to be held by the company is not to exceed five acres. The amendments in the Bill consisted in a different adjustment of the shares of the company, in the reduction of the number of directors, the lowest number named in the Bill having been nine, and the introduction of a test of purity.

The *Merthyr Tydfil Gas Act* gives power to the company, established in 1836, with a capital of £11,550, to capitalize £3300 expended on the works out of profits, and to raise an additional capital of £18,450, making the total capital of the company amount to £30,000. The sum of £3300 is to be capitalized as preference stock, with a fixed interest of 5 per cent.; and the dividends on the additional capital are limited to 7 per cent., and the interest on debenture stock, if issued, is not to exceed 5 per cent. The number of directors is not to exceed six, nor to be less than four, the qualification being £300 paid-up shares. The minimum illuminating power of the gas is to be 14 candles, and the maximum price 5s. per 1000 feet. There are some special provisions respecting the lighting of the public lamps. The terms are to be settled by agreement between the Local Board and the gas company, but if any dispute arise it is to be settled by arbitration, it being provided that the arbitrators or umpire shall not fix a higher charge than the lowest price charged to any private consumer, and the maximum price is not in any case to exceed 3s. 6d. per 1000 feet. The quantity of gas consumed may be estimated by meter, or otherwise. The illuminating power may be tested without notice, but there is no specification of purity. The quantity of land to be held by the company is limited to three acres. The committee on the Bill limited the dividends on the capitalized profits to 5 per cent.; they reduced the number of directors from seven to six; diminished the maximum price from 6s. to 5s.; they introduced the provisions respecting public lighting, and struck out of the Bill a clause for estimating the quantity of gas consumed by the public lamps by average meter indication, with a meter to every fifth lamp; they struck out, also, the notice to be given before testing the gas, and reduced the quantity of land required from five to three acres.

The *Worthing Act* incorporates a company established in 1836, and empowers them to increase their present capital of £12,250 by the issue of additional shares to the amount of £17,750, making the total share capital £30,000, the original capital being converted into capital stock of the same amount. The dividends on the new capital are limited to 7 per cent. The present number of directors may be reduced to six, and the qualification of a director is the possession of 15 shares of £10 each. Power is given to the company to purchase by compulsion certain land specified in the schedule; the term of compulsory purchase being limited to two years, and the quantity to six acres. Gas is to be supplied to the public lamps by average meter indication, but no price is stated. The maximum charge to private consumers is to be 5s. per 1000 feet; but it is provided that if the coal duty now levied in Worthing shall cease the price of gas is to be reduced 3d. per 1000 feet. The illuminating power is not to be less than 14 candles, and the gas is to be subjected to the usual tests for ammonia and sulphuretted hydrogen, no notice being required for testing, which must, however, be done not later than six o'clock in the evening. No residuary products are to be thrown into the sea within 200 yards of any dwelling. In the Bill the company required to be exempted from the duty on coal; the purity of the gas was not specified; the quantity of land specified was 10 acres; and there was no provision respecting the disposal of residuary products.

The *Yeadon and Guiseley Act* incorporates the Yeadon and Guiseley Gaslight and Coke Company, established in 1846 for lighting certain parishes in the West Riding of Yorkshire. The present paid-up capital of the company is £11,725, and they are authorized to increase it by the issue of additional shares to £29,325, the dividends on the new capital being limited to 7 per cent. Debenture stock may be issued. The number of directors is to be nine, which may be reduced to six; the qualification of a director being five shares of £10 each. The maximum price of 14-candle gas is 5s. per 1000 feet. The illuminating power of the gas may be tested without notice, no standard of purity being named. The company may purchase by agreement five acres of land. In the Bill the illuminating power of the gas was only 12 candles; a notice of 24 hours was required before testing; the land required was 10 acres; and there was no clause for the protection of incoming tenants, which is inserted in the Act.

Three Acts were passed giving statutory powers to companies without works, though not competing with any established company.

The *Llynvi Valley Gas Act* incorporates a company for supplying gas to certain small parishes in Glamorganshire not at present lighted with gas. The company are empowered to take by compulsion for the erection of works certain lands, the power of compulsory purchase being limited to three years. The capital is to be £10,000, in £10 shares, power being given to divide the shares into half-shares, one of which halves is to have preference, but with a limitation of dividend to 6 per cent. The qualification of a director is ten whole shares, and their number is not to exceed five. The maximum price of 14-candle gas is to be 7s. per 1000 feet for the first five years after the company begin to supply gas, and 6s. 6d. afterwards. The gas may be tested at any hour during the day without notice. Power is given to the company to purchase or lease the works of the Portcawl Gas Company. In the Bill the price of gas named was 7s., without any limitation of time, and 12 hours notice was required before testing.

The *Peterborough Act* incorporates the Peterborough Gas Company, Limited, which was registered in 1867, with the intention of competing with Mr. James Sawyer, the owner of the works with which that city had been lighted for many years. The registered capital was £10,000, in shares of £10; but the Act augments it to £20,000, with power to raise by additional shares £10,000, the dividends on the latter being limited to 7 per cent. on ordinary shares, and to 6 per cent. if issued with preference. The company are authorized to issue debenture stock bearing interest not exceeding 5 per cent. The number of directors to be ten, but reducible to five, the qualification of a director being the possession of 10 shares. The minimum illuminating power of the gas is to be 14 candles, and the maximum price 5s. per 1000 feet, and it may be tested without notice. The purity of the gas is not specified. Power is given to purchase the undertaking of Mr. Sawyer. In the Bill the capital of the company was stated to be only £10,000, and power was required to raise it to £20,000, with limitation of 7½ per cent. on the dividends on the additional shares. The power to purchase the existing gas-works was introduced by the committee. The committee also reduced the number of gas consumers on whose requisition to the Improvement Commissioners the gas may be tested from twenty to five.

The *Ystrad Act* incorporates a company established in 1867 for supplying a mining population in Glamorganshire with gas and water. The capital of the company is to be £20,000, in shares of £10, with power to issue debenture stock with interest at 5 per cent. A director's qualification is 10 shares, and the number of directors is not to exceed nine nor to be less than five. The minimum illuminating power is to be 14 candles, and the prices allowed vary, according to the quantity of gas consumed, from 6s. to 4s. per 1000 feet—the smallest quantity being 2000 feet within a quarter of a year, and the largest 60,000; the "expense in connexion with the gas-"works from derangements of the ground caused by mining "operations" being assigned as the reason for the prices allowed. Power is given to purchase five acres of land by compulsion, but that power is not to be exercised after the expiration of three years. There were no material amendments made by the committee on the Bill.

Four Acts were passed for the transfer of gas-works to local authorities.

The *Barrow-in-Furness Corporation Act* confirms an agreement between the Corporation and the Furness Gas and Water Company for the purchase of the works of that company for the sum of £82,500, the purchase to be completed on or before the 1st of January, 1869. The company's debts are to be paid by the Corporation. The Corporation are empowered to purchase, by agreement, for the purposes of the gas undertaking, five acres of land. The maximum price of 14-candle gas is to be 6s. per 1000 feet. No standard of purity is named, but the gas may be tested for illuminating power, on the requisition of five consumers, by order of two justices, and in case of default the Corporation are to forfeit £20, the amount of the penalties to be paid to the overseers of the poor. Power is given to borrow £150,000 for the purposes of the Act, of which amount £130,000 may be applied to purposes connected with the supply of gas and water, and distinct accounts are to be kept. In the Bill the Corporation sought for power to cut off the supply on failure of payment of the gas or water rent, but that clause is omitted in the Act. They also required to have six hours notice before testing the gas, which was not allowed.

The *Dundee Gas Act* confirms an agreement entered into between the two gas companies of Dundee and the magistrates and Town Council of Dundee for the sale and purchase of their undertakings, and for the appointment of commissioners to carry out the purposes of the Act. It is specified in the agreement that the Corporation shall pay to the shareholders of the gas companies annuities on the amount of their share capital, to be fixed by agreement or arbitration; that they shall also pay the value of the stores on hand and balances and arrears due at the time of taking possession of the works, and undertake to pay all the mortgage-debts and other liabilities of the companies; but it is provided by the Act that the sum of £40,000, which the commissioners are authorized to borrow, shall be deemed the whole amount referred to in the agreement as to be borrowed. One article of the agreement stipulates that the commissioners shall yearly make an estimate of the revenue derived from the sale of gas and of the expenses, including payment of the annuities, and shall then fix the price of gas at such a rate as shall as nearly as possible meet the annual payments, any surplus to be laid aside to form a sinking-fund; but the Act provides that the illuminating power is to be at least equal to 18 candles. The gas may be tested by order of the Town Council, the Local Board, or of five consumers, and if in default, the commissioners are to be liable to a forfeit of £20; but there is no standard of purity. The revenues are to be applied, first, in defraying the expenses; secondly, in the payment of the annuities; and thirdly, in payment of £1000 required to be set apart annually as a sinking-fund to be applied towards payment of the money borrowed and the redemption of the annuities. In case there should be a deficiency in the income to meet the annual payments, it is specified in the agreement that a "gas contingent guarantee-rate" shall be levied on all classes of property in Dundee. Many alterations were made in the Bill for the purpose of removing the objections raised to the indefinite character of the agreement; among which was the limitation of the amount of the money to be borrowed; the omission of the principle on which the valuation of the property was to be determined; and the minimum illuminating power of the gas, which was left undetermined, was specified. The Bill contained a reference to the Board of Trade should any dispute arise respecting the quality of the gas, but that has been omitted, and the penalty was imposed instead, but it is not stated how such penalty is to be applied.

The *Maryport Act* contains only one clause relating to the supply of gas, which gives power to trustees to purchase, "either by agreement or otherwise," or to lease and use for the purpose of erecting gas-works, certain lands described in a schedule.

The *St. Mary Church Local Board Act* confirms an agreement entered into between the Board and the Torquay Gas Company for the sale of all the mains, pipes, and other property of that company within the district of the Local Board. The agreement specifies the prices to be paid for existing mains, as follow:—All 2-inch mains, 2s. 6d. per yard; 3-inch mains, 3s. 6d.; and 4-inch mains, 4s. 6d.—a deduction of 6d. per yard being made for depreciation. All services, both large and small, to be taken at 15s. each. The Local Board are authorized to manufacture and supply gas, and to purchase by agreement six acres of land. The maximum price of 14-candle gas is to be 5s. 6d. per 1000 feet, and it is not to contain more than 20 grains of sulphur nor more than 5 grains of ammonia in 100 feet. The gas may be tested without notice on the requisition of five consumers, and if it be in default, the Local Board are to pay the amount of the penalty to the consumers making the order. The Local Board are authorized to borrow on account of the gas-works £15,000. There was no material alteration made in the Bill.

In all the foregoing Acts the gas companies are authorized to borrow in proportion to the amounts of the new share capital authorized.

Twelve Bills connected with the supply of gas were either rejected or withdrawn during the session—viz., the Cork Improvement Bill, the City of Dublin Gas Consumers Bill, the Dundee Gas Bill (No. 2), the Halifax Corporation Water-Works and Improvement Bill, the Imperial Company's Bill, the Leyton Gas Bill, the London Corporation Gas Bill, the Merstham, Nutfield, and Bletchingley Bill; the Metropolitan Gas Companies Amalgamation Bill, the Silverdale Improve-

ment Bill, the Sligo Borough Improvement Bill, and the Worthing, Broadwater, Heene, and West Tarring Gas Consumers Bill.

Circular to Gas Companies.

The appointment by the Board of Trade of the three gas referees, who will have to carry into effect some of the most important provisions of the City of London Gas Act, has caused much dissatisfaction. Two of them are objected to as incompetent, because they possess no special knowledge of the matters they will have to settle and prescribe; and the third one, though admitted to be highly competent, is in a position which, it is alleged, would prevent him from being an impartial arbitrator between the gas companies and the public. Mr. Dresser Rogers, the leading gas agitator in the Court of Common Council, who boasts that he it was who induced the Corporation to move in the matter, and to persevere until they obtained the Act, complains strongly of the appointments, in a letter to the *Daily News*, as being calculated to frustrate the intentions of the Legislature. Two of the gentlemen appointed, he observes, are entirely unknown in the gas world, and who, if impartial, would derive their knowledge from and be guided by the third, who is chief engineer of the Chartered Company. Mr. Rogers says it seems to him "to savour either of igno-"rance or wilful favouritism," to place the chief officer of the gas company "which has compulsorily been obliged to "accept the terms imposed under this Act in a position to "arrange for the just and fair carrying out of a measure "where the interests of his employers are so antagonistic with "those of the consumers;" and he hopes that "some public "expression of opinion will be made, so as to prevent the "continuance of such a scandal as this appointment. The question has also been taken up by the *Mechanics Magazine*, which, after stating the numerous important duties to be discharged by the gas referees, and the special knowledge required for their due performance, proceeds to examine the qualifications, so far as they are known, of the gentlemen appointed to act as "competent and impartial persons" in such matters. Of Mr. Pierce it is remarked that it is hard to see how his abilities as a railway engineer render him competent to decide the difficult and important questions which must come before him as a gas referee; and while conceding that Mr. Patterson has achieved a reputation as a financier, it is asked, "How "does that qualify him for a gas referee?" The writer then paraphrases the remark of a wit, when Louis XVI. appointed Calonne as Minister of Finance, that an arithmetician was wanted but a dancing-master got the place, by saying that "under the Gas Act a chemist is wanted but a financier has "got the place." The competency of the third referee is fully admitted, but his impartiality is questioned, because in the joint offices of engineer of the Chartered Company and of gas referee he would, in the latter capacity, have to prescribe the mode of testing the illuminating power and the amount of impurity to be tolerated in his own gas. It could, indeed, scarcely have been contemplated that Mr. Evans should continue to hold his office of chief gas engineer of the Chartered Company with that of a gas referee, for though he might, notwithstanding the difficult position in which he would be placed, discharge his duties in the latter capacity with strict impartiality, such an officer should not only be irreproachable, but above suspicion. Far be it from us to cast any reflections on the highly respectable gentlemen who have been appointed; but it must be admitted that there is some ground for the objections raised against their fitness to act as gas referees, who ought to enjoy to some extent public confidence. The appointments of the Board of Trade are generally admitted to be judicious, but in this instance they have failed to obtain the concurrence of the public; and it seems somewhat inexplicable, when the names of such men as Dr. Odling, Dr. Miller, and Mr. Hawksley, who would have been willingly accepted by all parties, were before their eyes, that they should have been passed over for others who are comparatively unknown. It would certainly be advantageous to revise the appointments, if it be not too late to do so.

It appears from letters inserted in the daily papers that complaints continue to be made of "gas monopoly," which indicate that the agitation of the gas question in the metropolis is not ended. The Bermondsey vestry have, indeed, wisely decided not to comply with the request of the vestry of St. James's parish to combine with them during the next session of Parliament to endeavour to procure the adoption of the provisions of the City of London Gas Act throughout the metropolis; but that refusal has served to give renewed energy to Mr. Dresser Rogers, who urges that the vestries should be made to take up the question in no niggardly spirit, and should insist on their representatives giving special attention to the questions of gas and water supply, "more particularly "when just at the present time there is so splendid an oppor-"tunity of gaining for the whole metropolis the same advan-"tages as the Corporation, by perseverance and energy, have "obtained for the City of London." Mr. Rogers, who writes from the Town Hall Chambers, Southwark, says he is determined not to give up the question until the consumers of gas in South London have derived at the least equal advantages with those of the City. But the vestries and local Boards of the metropolis will, we conceive, be too prudent to take any measures for further gas agitation involving an outlay of money until the results of the great experiment about to be tried in the City be known—Mr. Rogers's determination to compel them notwithstanding. In the meantime, however, it behoves the gas companies to attend courteously to all complaints that may be made as to inaccurate registrations of meters or otherwise, for there seems, from the letters in the newspapers, to be an impression that, though the price of gas per 1000 feet has been reduced, the gas bills at the end of each quarter become greater in amount instead of less.

The French papers have noticed some experiments on what was said to be a new system of gas lighting, exhibited recently to the Emperor at Plombières. The invention was stated to be approved by many *savants*, and by General Favé, the director of the Polytechnic School, by whom it was brought to the Emperor's notice. His Majesty, after a minute examination of the apparatus, congratulated the inventor, and a rapid and certain success was predicted for a discovery which it was thought promised grand results. This brilliant dawning of a new light that was to astonish the world has, however, been considerably dimmed by the researches of our contemporary, *Le Gaz*, which asserts that the wonderful discovery is nothing more than the old and exploded means of lighting by naphthalized air! We may mention also that the magnesian oxyhydrogen light, experimented with some months since at the Hôtel de Ville in Paris, is admitted to be a failure; and it is now proposed to substitute zircon points for the compressed magnesia before used.

The destructive fire at Saville House, in Leicester Square, caused by an explosion of the Chartered Company's gas, was a costly lesson of further precautions required which that company will long remember; but, as if the legal penalties incurred were not sufficiently instructive, they have been called on to pay for property which there is good reason to suppose was not destroyed. Matthew Morris, the proprietor of the New York Hotel, in Leicester Street, and formerly a tenant of Saville House, made a claim on the company for mirrors and numerous other articles to the amount of £2700, which he alleged—falsely, as is averred—were in the house at the time of the fire, and were destroyed. Morris is in custody, charged with fraud, and was brought up before the magistrate at the Marlborough Street Police Court, when it appeared from the evidence against him that he had removed goods at various times shortly before the fire from Saville House to the New York Hotel, and that there was scarcely any furniture in the rooms when the explosion of gas occurred. Morris brought an action against the company, which was referred to arbitration; but, in consequence of what transpired during the proceedings, he was given into the custody of the police.

It appears from the report of the directors of the Maryport Gas Company—a copy of which has been forwarded to us—that they have got into a seemingly interminable perplexity with the Town and Harbour Trustees in the negotiations for the sale of their undertaking, which have been going on for nearly two years. An offer for the purchase of the gas-works was originally made by the trustees, as a means of settling disputes about the lighting of the town and harbour, but no terms were specified; and the directors were equally reluctant to state on what terms they would recommend the shareholders to sell. The matter was brought to a point by the trustees giving notice in November last of their intention to apply to Parliament for an Improvement Act, in which they required power to construct new gas-works. To avoid a parliamentary contest, the directors then proposed to sell their undertaking for an equivalent of about £16 per share, on which £14 had

been paid. The trustees declined that offer, but they agreed to purchase the works at a price to be fixed by arbitrators. The directors assented, an amicable arrangement of long-pending disputes seemed in prospect, and the opposition to the further progress of the Bill promoted by the trustees was withdrawn. That prospect of an amicable settlement was, however, blighted by an intemperate letter from the directors to the trustees, in which one member of the Board was assailed for having made remarks on the company which were declared to be "long-winded," "prosy," and "written in a spirit of "malignant animosity." The arrangements for the arbitration nevertheless proceeded, and Mr. Barlow was named as arbitrator on behalf of the company. The trustees—whether acting in good faith or otherwise we will not express an opinion—appointed for their arbitrator Mr. Flintoff, whom Mr. Barlow declined to meet in conference; and, after some correspondence, a solicitor was appointed to act on behalf of the company. The trustees, having obtained their Act, seemed inclined to withdraw from their agreement, and have since repudiated it altogether; but they offered to purchase the gas undertaking at the price of £10 per share, intimating that if the offer were rejected they would construct gas-works of their own. The directors consider the trustees to be legally as well as morally bound by the agreement, but in the meantime they have consented to continue the lighting of the town and harbour at an advance on the former price, without prejudice to the agreement for the purchase of the gas-works; and in this unsatisfactory position the matter stands. The great mistake made by the company has been in naming any price whatever, whether £16 per share, or any other sum. They should simply have gone to arbitration, as provided for in their Act; and, under judicious counsel, they would, no doubt, have been as successful as the proprietor of the Peterborough Gas-Works under somewhat similar circumstances.

The Chartered Gas Company are proceeding vigorously with their preparations for the erection of their new works at Barking Creek. The contract for the river wall has been taken by Messrs. John Aird and Sons, and they have also contracted with the Weardale Iron and Coal Company, and with Messrs. Hopkins, Gilkes, and Co., of Middlesborough, for the supply of 14,000 tons of large pipes for the trunk-main, at £4 10s. per ton for the plain pipes, and £4 17s. 6d. per ton for turned and bored pipes, delivered in the Thames, at Barking.

The sale by auction of the works of the Matlock Gas Consumers Company, which is advertised to take place on Saturday next, will be watched with some curiosity, as the sale of gas-works in that manner is a rare occurrence. They are, we believe, the works of a competing company, the money capital of which having proved insufficient to pay their debts, a forced sale by the creditors has become necessary.

Very satisfactory reports have reached us respecting the efficiency of the method patented by Mr. G. N. Edge of removing carbonaceous incrustations from the interior of clay retorts. By this process the operation of "scurfing" is performed perfectly in less than one hour, without injuring the retort, instead of occupying one or more days, which the usual mode of burning off the incrustation requires. The royalty of 5s. per retort per annum, on the average number of retorts in action, would, under such circumstances, be soon saved. The agency for the patentee in this country has been taken up by Mr. Goddard, of Ipswich.

The rapid advance which has recently taken place in the shares of the metropolitan gas companies shows that, on the whole, the influence of the City of London Gas Act on gas property is not regarded as unfavourable. The Chartered Company's shares, which two months ago were quoted at £47 and £48, are now at £54 and £56; and the Imperial Company's shares have risen within the same period from £64 to £72. A nearly similar reaction followed the depression consequent on the agitation which preceded the passing of the Act of 1860. This advance augurs favourably for the approaching dividends.

The review in the preceding columns of gas legislation during the past session presents a continuance of the same tendencies in the regulation by Parliament of the supply of gas which have of late years been observed, and there seems to have been much uniformity in the decisions of the committees to whom the Bills were submitted. With only one exception the standard of illuminating power has been raised to not less than 14 candles, and the maximum price proposed by the promoters of the Bills has in most cases been reduced. There were, indeed, two remarkable exceptions, in the Bills of the Cork and of the Loughborough Gas Companies, in which the maximum price was increased, accompanied in the former case with an increase of illuminating power. The additional power applied for to increase capital was in most instances granted, and the money expended on works out of profits was generally allowed to be capitalized, but restrictions were placed, in several instances, on the quantity of land required. The prescribed dividends on the new shares were limited to 7 per cent. on ordinary shares, and to 6 per cent. if issued with preference; the only exception being the Act of the Leeds New Gas Company, by which the dividends on all the shares are limited to 6 per cent., and the interest on debenture stock to 4½ per cent. In the case of one company only (the Brentford) were the dividends prescribed proportioned to the price charged for gas, the highest rate allowed being 10 per cent. The sliding scale was introduced in the committee, while another committee struck out the sliding scale of dividends which had been inserted in the Bill. The charge for gas supplied to the public lamps, where provided for, is generally the same as the lowest price charged to private consumers; but in the Burslem Act the charge to the railway company is excepted, and by the Merthyr Tydfil Act it is provided that the price is not to exceed 3s. 6d. per 1000 feet. The estimation of the quantity of gas consumed by the public lamps by average meter indication is increasing in favour. In nearly all the Acts it is provided that the gas may be tested without notice, and clauses for the protection of incoming tenants against claims for arrears were invariably inserted in the Bills when omitted. Only two Bills for the incorporation of competing companies were submitted for consideration to the committees, and neither of them was passed. The number of Bills rejected or withdrawn amounted to one-third of the whole. The amount of new share capital authorized to be raised was £1,392,180, on which the companies were empowered to borrow £349,016, making the total of new share and loan capital amount to £1,741,196, distributed among the companies applying for further powers in the following proportions:—

Name of Company.	Present Capital.	New Shares.	Borrowing Power.
Brentford. . . .	£229,700	£250,300	£62,560
Burslem & Tunstall .	28,000	50,000	12,500
Calverley & Horsforth	14,000	36,000	9,000
Chartered. . . .	900,000	650,000	162,500
Chichester . . .	New compy.	18,000	4,500
Clevedon	8,000	20,000	5,000
Cork Consumers . .	120,000	30,000	7,500
Eastbourne . . .	20,000	30,000	7,500
Farnworth & Kearsley	24,000	30,000	7,500
Hythe & Sandgate .	6,660	17,340	4,325
Leeds New Company	192,500	100,000	25,000
Loughborough . .	13,330	11,740	3,932
Llynvi Valley. . .	New compy.	10,000	2,500
Merthyr Tydfil . .	11,550	18,450	4,612
Morley	11,100	35,000	8,750
Peterborough. . .	New compy.	30,000	7,500
Worthing . . .	12,500	17,750	4,437
Yeadon & Guiseley .	11,725	17,600	4,400
Ystrad	New compy.	20,000	5,000
	£1,603,065	£1,392,180	£349,016

Register of New Patents.

3531.—EPHRAIM DEATH, of Leicester, in the co. of Leicester, engineer, for "*Improvements in steam-pumps.*" Provisional protection only obtained. Dated Dec. 12, 1867.

This invention consists, first, in arranging the crank-shaft of direct-acting pumping-engines in such a manner that, when the engine is fixed horizontally, the centre of the crank-shaft shall be above the centre line of the pump-piston, the crank-shaft working in bearings fixed or cast upon the barrel of the pump. By these means the eccentric for working the slide-valve of the steam-cylinder can be placed in a direct line, and level with the valve spindle or rod.

The invention also consists in forming a boss or crosshead upon the plunger or centre of the piston-rod, also above the longitudinal centre line, this boss forming a bearing for one end of the connecting rod or rods, the other end of the connecting-rod working upon a crank-pin, inserted at a proper distance from the centre of the crank-shaft, to give the requisite stroke of piston and plunger. This crank-pin is inserted into the boss of a small fly-wheel, to form a crank when one connecting-rod only is used; but, in some cases, two rods may be used, one on each side; then two fly-wheels may be used, or one fly-wheel and a crank on the opposite side.

The invention also consists in forming a projecting shoe or slide on the opposite side to the crosshead boss on the plunger or piston-rod, this shoe or slide extending low enough to work upon a raised face or guide cast upon the bed-plate which carries the cylinder and pump.

3554.—Henry Atkinson, of 33, Wharf Road, City Road, in the co. of Middlesex, for "*Improvements in gas-retort ovens and furnaces.*" A communication. Patent dated Dec. 14, 1867.

This invention relates to gas-retort ovens and furnaces, and consists of improvements in the form and construction of the furnace, and in the arrangement of the furnace flues and grate.

The objects of this invention are, first, to increase the heating power of the furnace; secondly, to render the heat more uniform upon the retorts, and thereby lessen its destructive effect, and at the same time to economize the consumption of fuel and render the distillation of coal in the retorts more perfect, and increase the quantity of gas and coke producible from a given quantity of coal; and, thirdly, to increase the facility for charging the furnace with fuel.

The retorts are placed in an oven in the usual way, and open spaces are left for the circulation of the heat from the furnace on all sides. The fireplace and grate are formed at the front of and at a considerable depth below the oven, and the bottom is fitted with a sliding cast-iron water and ash container. The fire-bars are placed above the ash-pan one above another in a sloping direction, or inclining upwards and backwards from the bottom. Above the bars, and similarly inclined, is fitted a stout metal plate with side flanges, so as to form (when placed against the brickwork or face of the superstructure of the oven) a feeding-hopper or box for containing the coal, coke, or other furnace-fuel; this feeding-hopper or fuel-container may and should extend from the top of the furnace-bars to the level of the floor of the retort-house, and be closed or fitted with a moveable plate or cover.

The mode of charging is as follows:—The covering-plate last mentioned being removed, the feeding-hopper is to be filled with fuel up to the level of the floor; the fire being then lighted, the furnace is then supplied with air through the horizontal spaces between the bars, inclined as before stated; the air thus passes entirely through the fuel, and causes a perfect combustion thereof, while the heat is conducted thence by the flues (hereinafter described) to the oven above, where it is concentrated upon the surface of the retorts. As the fuel is consumed in or at the bottom of the furnace, the waste is supplied by the gradual descent of that in the hopper, and a uniform heat is thus maintained, while its intensity is increased by the more perfect combustion which results from the mode of admitting the air, partly by the improved inclined grate, and partly by the ducts or flues hereinafter described. By placing the grate-bars one above another and supporting their ends upon corbels or side supports, or in recesses, the whole or any number of the said bars can be removed and replaced with facility; thus provision is made for clearing the bottom of the furnace of clinkers, ashes, or other refuse, when necessary. To clear the bars of clinkers, all that is required is to pass the end of the stoking-iron or furnace-rake between the bars, and thus push the clinkers into the fire, where they will melt, drop into the sliding water and ash container, and be readily removed. Air-ducts or flues are to be made for the admission of air from the exterior to the interior of the furnace, their outer apertures being fitted with closing and regulating covers, dampers, or valves, for regulating the quantity of air thus admitted.

3563.—Edward Hammond Bentall, of Heybridge, near Maldon, in the co. of Essex, agricultural implement manufacturer, for "*Improved apparatus for controlling the draught of water from constant-supply pipes.*" Patent dated Dec. 14, 1867.

This invention relates to certain novel arrangements of apparatus for enabling water companies to afford a constant supply and an augmented quantity of water to their customers without the risk of waste or the appropriation of an undue quantity by individual consumers. These objects are effected by the use of a closed or air-tight vessel (from which the water is to be drawn), so fitted that either the supply thereto or the discharge therefrom will not be contemporaneous, or if contemporaneous, the supply will, even under the most adverse circumstances, be limited to a certain maximum allowance.

In adapting the invention to a public or street supply, a cylindrical vessel, which consists of a tube of enamelled wrought iron, closed at top and bottom with cast-iron ends, is enclosed within a pillar. The bottom, which is cast on or riveted to the tube, is shaped like an inverted hollow cone to allow deposits to collect and discharge at a central opening; this casting is provided with an extension, forming a valve-seat, in which are inlet and outlet ports. These ports are covered by a slide-valve, which works in a valve-box made fast by screws to the extension. The valve-box is formed with a screwed coupling for receiving the inner end of the supply-pipe, and coupled to the valve-rod of the slide-valve is a hand-lever, which rocks on a fixed fulcrum, and is intended to operate the slide-valve, or in place of the slide-valve seat-valves may be employed. Cast on or riveted to the upper end of the cylinder is a flanged ring, which rests on a lip formed at the top of the pillar to carry the vessel from which the water is to be drawn, and fitted to this ring is a removable cover of cast iron, by which access is gained to the interior of the vessel. An ornamental cap closes the top of the hollow pillar. The weight of the hand-lever serves to depress the valve, and, when depressed, it opens a communication between the valve-box and the cylindrical vessel. By lifting the lever the valve will be raised and the supply will be cut off. The water contained in the vessel will then be free to escape through the outlet-port, and the discharge will continue only so long as the valve is up, or while there is water in the vessel. When the handle is let go the valve will close the outlet-port, and allow the vessel to refill. In order to permit of the closed vessel filling, an air-pipe is provided, which communicates at its lower end with the atmosphere, and leads from the bottom to near the top of the vessel. At its upper end this pipe is fitted with a socket, to which is hinged a lever; this lever carries at one end a valve or plug and at the other a lever fitted with a float. As the vessel fills the float will rise, and the lever will then bring down the valve and close the air-pipe. As soon, however, as the water-level falls the plug or valve will rise and allow a free access of air to fill the vacancy caused by the discharge of water from the vessel.

When adapting the invention to a constant house supply, the supply-pipe or channel is fitted with a gauge-nipple, the bore of which must be regulated to suit the rate of supply required.

3572.—James Eglinton Anderson Gwynne, of Essex Street Works, Strand, in the co. of Middlesex, engineer, for "*Improvements in sinking tubes or cylinders for obtaining and raising water, and in the apparatus for effecting the same.*" Provisional protection only obtained. Dated Dec. 16, 1867.

This invention consists in the use of a cylinder or tube of iron, or other suitable metal, pointed, perforated, or open, having a screw or screws at the lower end, or the tube itself may be spiral. The tube thus formed will penetrate the earth or soil with greater facility than with a plain surface. It will enter the earth or soil by being propelled by a rotary motion from the top. To the top end is fixed a tightening collar on the principle of gas-tongs, which tighten according to the pressure of the levers; the levers are used like capstan-bars, and may be spare lengths of pipe screwed into or otherwise fixed to the collar. The tube may be perforated to admit the more free action of water. When the tube or cylinder is of large diameter, it is preferred to sink it with the lower end open, thereby reducing the friction. The earth can be removed from the inside of the tube by the insertion of a counter screw, or excavator, which, by the rotary motion, will raise the soil to the surface, and clear the interior.

3578.—William Jackson and Joseph Dyer, of Birmingham, in the co. of Warwick, for "*Valves and valve-cocks.*" Provisional protection only obtained. Dated Dec. 16, 1867.

This invention relates to improvements in the construction of valves and valve-cocks applicable to the ingress and egress of liquids and fluids. An important part of the invention consists in the mode of actuating the valve-stem. This is effected by means of an eccentric boss, which is formed on or attached to the actuating spindle, and works in a slot in the valve-stem, so that when the spindle is partially rotated the valve is opened or closed. There are other features included in the invention.

3587.—Ernest Marie Du Boys, of Paris, France, government engineer, for "*Improvements in liquid-meters or apparatus for measuring and registering the volume of water or other liquid flowing under pressure through pipes or ducts.*" Patent dated Dec. 17, 1867.

These improvements relate to apparatus for gauging or measuring and registering the volume of water or other liquid flowing under pressure through pipes or other ducts or channels, the same being principally intended for gauging water for the supply of cities or other localities, steam-boilers, or other similar purposes.

The improved apparatus consists of, firstly, a gauging-vessel formed by means of two hollow shells of cast iron or other suitable material, and of exactly the same shape and size-bolted together by their rims, the interior of the vessel thus formed being divided into two chambers by means of, secondly, a diaphragm or partition consisting of a central rigid metal disc fixed all round to the inner periphery of an annular washer of india-rubber, leather, or other suitable flexible impervious material, the outer periphery of which washer is fixed between the rims of the two shells of the gauging-vessel. Thirdly, a four-way or other suitable distributing cock, valve, or slide, for connecting alternately each of the two chambers of the gauging-vessel with the entrance or supply and the exit or delivery pipes for the liquid to be gauged to enter into and leave the gauging-vessel. Fourthly, either a weight to be lifted or a spring to be bent by the strain exerted on them by the diaphragm during its oscillatory motion caused by the pressure of the liquid, the falling down of the said weight or the relaxing of the spring taking place on the diaphragm finishing its stroke and causing the distributing-cock to shift position, thereby procuring the reversing of the conditions of entrance and exit of the liquid into and from the gauging-vessel. Fifthly, a counter index or registering train for indicating the quantity of liquid that has passed through the gauging-vessel. The diaphragm of the gauging-vessel divides this latter into two chambers or divisions which do not communicate together, but are each of them provided with an orifice for the entrance and the exit of the liquid to be gauged. The diaphragm is allowed to oscillate or move to and fro alternately from one shell to the other, and its shape and size are such that it may without extending apply itself alternately against the inner surface of each of the two shells. A metal rod or stem is fixed to and passes through the metal disc of the diaphragm, the said rod working in stuffing-boxes provided in both shells, whilst to each of its ends is fixed a knob gliding in a guide-slot.

3590.—William Armand Gilbee, trading under the name or style of L. de Fontainemoreau, of 4, South Street, Finsbury, in the co. of Middlesex, patent agent, for "*Improvements in the method of and apparatus for raising water.*" A communication. Patent dated Dec. 17, 1867.

This invention consists in raising water by combinations of apparatus or pumps, moved by the wind, by steam, or by a waterfall formed either by a natural current of water, or by a flow of water from a reservoir previously filled, or by combinations of these three motive forces, from lower variable levels to higher variable levels, in such a manner that, whatever may be the distances between these levels, the water is never raised to a height greater than these distances; and the invention also consists in an improved construction of pump and windmill for the aforesaid purposes.

3591.—William Edward Newton, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*An improved method of and appa-*

ratus for the manufacture of tinned leaden pipes." A communication. Patent dated Dec. 17, 1867.

According to this invention a cylindrical casting of lead is first prepared of the requisite size and thickness; a mandril is then placed in the centre of this casting in such a way that there shall be left an annular space round the mandril and between the mandril and the inner side of the leaden cylinder. Into this annular space molten tin is run to form the internal coating. The cylinder or tube thus prepared is then submitted to the action of an hydraulic press, which forces the metal out in the form of a lead pipe lined with tin, and rolls it up in a coil in the manner that ordinary leaden pipes are coiled when manufactured by hydraulic pressure.

3623.—Edward Field, of Chandos Chambers, Adelphi, in the city of Westminster, consulting engineer, and Frederic Pelham Warren, of Norwood, in the co. of Surrey, commander in the Royal Navy, for "*An improved cowl for chimney-tops.*" Provisional protection only obtained. Dated Dec. 20, 1867.

In carrying out this invention the chimney-top is provided with a loose cap, the lower edge of which extends somewhat below the upper edge of the chimney-top, and this cap is supported by a shaft, spindle, or arms, so that the effect of the wind blowing in any given direction against the side of the cap will be to force that side of the cap against the chimney-top, and so protect the latter from any undue action of the wind, and thus permit the uninterrupted exit of the smoke at the other side between the upper edge of the chimney-top and the lower edge of the cap.

3624.—Levi Lincoln Tower, of the state of Massachusetts, U.S.A., for "*A new and useful invention having reference to faucets and vessels for measuring liquids.*" A communication. (Complete specification.) Patent dated Dec. 20, 1867.

This invention consists in the construction of a faucet and measuring-vessel or funnel so combined and arranged that, when the faucet is inserted in a vessel or barrel for extracting a liquid therefrom, such liquid, by the key-plug or valve of the faucet being turned, may be caused to either run into the measuring-vessel, or be discharged therefrom through the faucet, the purpose being to first let into the measuring-vessel any desirable quantity of such liquid, and next to arrest the flowage of it into such vessel and discharge it by the faucet. The invention further consists in the combination and arrangement of a deflector with the measuring-vessel and the faucet, such deflector being to prevent the liquid while entering the funnel or measuring-vessel from being thrown out of or above it by the head or pressure of liquid in the vessel from which such liquid may be extracted. The invention further consists in a peculiar arrangement of the measuring-vessel, the faucet, and its eduction-tube, in order to bring the top of the measuring-vessel down to or about the level of the inner surface of the bottom of a barrel or vessel to which the combined faucet and measuring-vessel may be applied, thereby enabling all the liquid contents of the vessel to be extracted.

3626.—John Thomas Kershaw, of 90, St. Paul's Road, Islington, in the co. of Middlesex, surveyor, for "*An improved ventilator.*" (Complete specification.) Provisional protection only obtained. Dated Dec. 21, 1867.

This invention is not described apart from the drawings.

3630.—William Walker, of Rochdale, in the co. of Lancaster, and Edward Holt, of Newton Heath, in the same co., for "*Improvements in direct-acting double-action steam-pumps.*" Provisional protection only obtained. Dated Dec. 21, 1867.

According to one arrangement, a horizontal steam-cylinder and pump-barrel are employed, which are cast to a foundation-plate, and they connect together the piston of the cylinder and plunger of the pump, and also the steam, slide, and water valves. The body of the piston and piston-rod are of one piece, and the rod is of enlarged diameter, so that there can be an internal bore in the piston and rod for about the length of the stroke. In this bore is placed a small piston, the rod of which passes through the main piston and one of the covers of the cylinder, and is jointed to one arm of a two-armed lever, the other arm of which is jointed to the slide-rod, and in the bore of the piston is fixed a ring or plate encircling the small piston-rod. As the piston is arriving to one end of its stroke, the ring or plate comes in contact with, and gives motion to the small piston, so as to give motion to the two-armed lever, and give one traverse to the slide, and when the piston is arriving to the other end of its stroke, the bottom of the internal bore acts on the small piston and gives reverse motion to the two-armed lever for causing the slide to travel in the reverse direction, and thus a reciprocating motion is given to the steam and water valves without the ordinary eccentric or tappets. Steam is allowed to enter the before-mentioned internal bore, to act as a cushion and prevent the overrunning of the steam and water valves.

3656.—Christopher Pottinger, of Anstruther, in the co. of Fife, N.B., shipbuilder, for "*Improvements in motive-power engines, part of which improvements are applicable to the arrangement and construction of pumps for raising and forcing liquids, fluids, and other substances generally.*" Provisional protection only obtained. Dated Dec. 24, 1867.

This invention relates, *inter alia*, to a novel arrangement of motive-power engine of the class known as rotary engines, and consists in the use of a cylinder in which a revolving piston is placed, the part of the piston against which the steam or other motive agent acts being packed so as to closely fit the space of the cylinder in which it revolves. The cylinder is provided with ports or passages in communication with both sides of the projecting part of the revolving piston, on one side of which the motive agent for driving the engine is admitted, and on the other or opposite side, and through the opposite passage or passages, it escapes or exhausts. The passages are provided with a valve or valves which is or are opened and closed by the motion of the engine at the proper time, and by means of the valve or valves the admission of the motive agent may be cut off at the required moment, and the motive agent (provided it be steam, compressed air, or other elastic fluid) can thus be worked expansively.

3675.—Tristie James Ellis, of Abingdon Street, in the city of Westminster, civil engineer, for "*Improvements in the construction and arrangement of apparatus for carburetting gas and atmospheric air.*" Provisional protection only obtained. Dated Dec. 27, 1867.

This invention consists in the construction and arrangement of an apparatus having a reservoir at the upper part thereof for the purpose of containing the carburetting liquid. The liquid passes from the reservoir through a tube which is provided with a regulating valve, and descends nearly to the bottom of the apparatus, and rises again, the orifice thereof being close to the under side of the reservoir. The carburetting liquid passes through the tube and falls into a chamber having at its under side small perforations through which the liquid descends into wicks of cotton or other suitable material, which are arranged vertically in a second chamber below, so that the liquid shall trickle or flow down the wicks. The liquid which is not evaporated from the wick passes into the bottom of the chamber. One or more condensing-chambers is or are provided, the same being cooled by the evaporation of liquid, the gas or air being first allowed to pass into such chamber or chambers. The result of this arrangement is that the deposit of the tar water, vapour, or other product on the wicks is prevented.

3682.—John William Lewis, of the town and co. of Newcastle-upon-Tyne, engineer, for "*Improvements in warming, ventilating, and heating apparatus.*" Patent dated Dec. 27, 1867.

This invention requires the aid of drawings for its elucidation.

3685.—Jacob Goodfellow, of the Atlas Works, Blackburn, in the co. of Lancaster, engineer, for "*Improvements in metallic pistons for steam-cylinders, air-cylinders, or pumps.*" Patent dated Dec. 28, 1867.

This invention relates to pistons having an expanding metallic packing, and consists in a novel combination, by means of which a great amount of elasticity in the metallic packing is obtained. The portion of the packing which is in immediate contact with the cylinder when in use is formed of two split rings, each ring being of a triangular or nearly triangular shape in section, the two rings being placed in the piston with their narrowest sides or edges in contact, or nearly in contact. A third split ring is placed inside the two outer rings, the inner surface of which is parallel or nearly parallel with the central axis of the piston, and the outer surface being formed of two inclined faces, the form of this outer surface being made suitable to fit against the interior surfaces of the two outer rings. Inside this third ring is placed a fourth ring of spiral form, produced from a cylinder by cutting the cylinder in a lathe in the ordinary manner, or by other suitable means; the said spiral ring exerts an elastic pressure against the next outer ring, which outer ring transmits the said elastic pressure in addition to the pressure due to its own elasticity to the rings in contact with the interior of the cylinder. The order in which the several portions of the metallic packing are described as being placed in the piston is not necessarily the order in which they are to be placed when the piston is being put together or packed.

3687.—William Fryer, of Birmingham, in the co. of Warwick, plumber, for "*Improvements in self-closing taps.*" Provisional protection only obtained. Dated Dec. 28, 1867.

In making a self-closing tap according to this invention, any kind of tap may be employed which can be opened and closed by the motion of its axis through about a quarter of a rotation, and the said tap is fixed in a box or chamber made by preference of cast iron, the ingress and egress pipes passing through the sides of the said box to the tap. To the axis of the tap is attached an arm or lever, and to the end of the said arm or lever is connected one end of a spring of vulcanized india-rubber or a coiled steel spring, the other end of the spring being connected to the side of the box or chamber. The said spring tends to keep the tap in its closed position. To the end of the arm or lever a rod, chain, or cord is attached, the said rod, chain, or cord being in a line with the spring described, but on the opposite side of the arm or lever. The free end of the said rod, chain, or cord passes through the side of the box or chamber, and terminates in a knob or handle. In using the tap, the knob or handle is pulled when the axis of the tap is opened, and water or liquid allowed to flow. On loosing the knob or handle the spring pulls back the arm or lever and closes the tap.

3696.—Charles Churchill, of Norwood, in the co. of Surrey, merchant, for "*An improved gas-burner.*" A communication. Provisional protection only obtained. Dated Dec. 28, 1867.

This invention consists, chiefly, in a novel construction and arrangement of the parts of a gas-burner, by which the gas and air are well heated before coming in contact with the flame, thereby securing the most perfect combustion; also in a peculiarly formed cock and an independent supply-aperture, whereby a small flame is kept burning when the main flame is extinguished, thus, with trifling additional cost, avoiding the annoyance of relighting and the danger arising from the escape of unconsumed gas.

3706.—Marc Antoine François Mennons, of the firm of Mennons and Telescheff, home and foreign patent agents, of 8, Southampton Buildings, in the co. of Middlesex, and 53, Rue de la Chaussée d'Antin, Paris, in the empire of France, for "*Improvements in the mode of and apparatus for combining the vapours of liquid hydrocarbons with oxygen and hydrogen, and burning the mixture as fuel.*" A communication. Patent dated Dec. 31, 1867.

This invention consists in a new and improved method and apparatus for combining the vapours of petroleum, shale oil, and other liquid hydrocarbons, with oxygen and hydrogen gas, and burning the mixture as fuel.

In order that the principal features of this invention may be more

prominently set forth, it is proper to state here that only two distinct modes of burning the above-named ingredients have hitherto been experimented on a large scale, namely, the "retort or vaporizer," and the open or "surface burner" systems. In the first the material is led into a closed vessel or retort, volatilized by the application of heat, then discharged and burned as gas or vapour. This method has been found in practice to be attended with danger, and the interior of the retort soon becomes incrusted by the adhering to and burning on it of the heavier products of the oil, whereby the vaporization becomes slower and the fire from the jets gradually dies out. Besides, this system is only applicable to the generation of steam. The "surface burner," though superior to the other, and of more general application, possesses several radical defects, such as the escape unconsumed of a large per centage of combustible matter, there being no suitable method of arresting and retaining the same for complete combustion. This bears directly upon the question of the economy of using hydrocarbons as fuel.

The result of experiments hitherto made is to prove most conclusively that the greater the degree of heat maintained in and around the apparatus when working, the less oil is consumed in proportion to produce given results. It is well known that none of the contrivances hitherto invented can maintain a continuous heat of more than about 300° Fahr., while in order to reach the point of greatest economy and perfect combustion there should be continually prevailing a temperature of as many thousand degrees of heat. To secure this and other important results is the object of the present invention.

The appearance of the apparatus as a whole is that of a letter D resting upon its flat side. The lower or flat part is the burner proper, while the semicircular portion joined with the other constitutes the retort. Both parts may be made with ordinary fire-brick or of fire-clay, or any material capable of resisting intense heat and of retaining or reflecting heat without transmitting it. The upper portion should be made of this or other similar material, while for all ordinary purposes the lower portion may be made of cast iron or other metal, as the blast thrown against this part is always sufficient to prevent melting. The style and shape of either part depend upon the uses and places in which it is to be put. The two sections when united form a complete combustion-chamber. The upper segment of the retort proper is constructed to form a hollow chamber as large as may be convenient to receive iron filings, coke, coal, or any material which when heated will assist in producing hydrogen gas from water or steam, or in superheating atmospheric air, either one to be conducted into the said chamber by means of a pipe or pipes within, and properly protected by the material composing the retort. This gas so obtained or the superheated air is to be discharged into the burning mass below through jets or openings pierced in the upper interior portion of the retort. Access may be had to the chamber for the purpose of replenishing the decomposing or heating material, by means of a small moveable section in front or other convenient place.

APPLICATIONS FOR LETTERS PATENT.

2808.—George Bower, of St. Neots, in the co. of Huntingdon, gas and water work engineer, and William Hollinshead, of the same place, engineer, for "*Improvements in gas-engines.*" Sept. 11, 1868.

2813.—Frederick Warner, of Jewin Crescent, in the City of London, engineer, for "*Improvements in constructing bore-holes or wells, and in pumps to be used therewith, and for other purposes.*" Sept. 12, 1868.

2831.—Martin Benson, of 14, Hinde Street, Manchester Square, in the co. of Middlesex, for "*Improvements in steam pumping machinery or engines.*" A communication. Sept. 15, 1868.

2832.—Enoch Sarjeant, of Birmingham, in the co. of Warwick, metal worker, for "*Improvements in the manufacture of gaseliers, gas-pendants, gas-brackets, gas-standards, and other gas-fittings.*" Sept. 15, 1868.

2834.—Charles de Bergue, of 10, Strand, in the city of Westminster, engineer, for "*Improvements in gas-cooking stoves.*" Sept. 15, 1868.

2863.—William Edward Newton, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improvement in apparatus for raising water and other fluids.*" A communication. Sept. 17, 1868.

2866.—Henry Wilson, of Stockton-on-Tees, in the co. of Durham, for "*Improvements in engines worked by hydraulic fluid or steam power, and in mechanism or apparatus used in regulating the supply of water or other fluids, the same being applicable, amongst other uses, to water-closets, lavers, and gas-pipes, for the prevention of waste of water, gas, or other fluids.*" Sept. 17, 1868.

2881.—William Needham and James Kite, both of Vauxhall, in the co. of Surrey, engineers, for "*Improvements in machinery or apparatus for depurating fluids.*" Sept. 18, 1868.

2883.—William Henry Hughan, of Newton Stewart, N.B., postmaster and guano and seed merchant, for "*Improvements in the treatment of night-soil, sewage, and other like refuse matters, for the purpose of deodorizing and converting the same into manure.*" Sept. 19, 1868.

2886.—Martin Macdermott, of 18, Edwardes Square, Kensington, in the co. of Middlesex, architect, for "*A new street-lamp reflector.*" Sept. 19, 1868.

2898.—John Henry Johnson, of 47, Lincoln's Inn Fields, in the co. of Middlesex, gentleman, for "*Improvements in machinery or apparatus for lighting and regulating the flow of gas employed for illuminating purposes.*" A communication. Sept. 19, 1868.

2902.—Charles Wheeler, of Speenhamland, in the co. of Berks, smith and ironmonger, for "*A new or improved apparatus, tap, or joint for turning on or cutting off the supply of liquids.*" Sept. 21, 1868.

2919.—Edward Henry Prentice, of Stowmarket, in the co. of Suffolk, for "*Improvements in treating sewage and impure or polluted waters, and in the preparation of materials to be employed for that purpose.*" Sept. 23, 1868.

2931.—Charles Henost, of Fulham Road, in the parish of Chelsea, in the co. of Middlesex, engineer, Henry Watson, of the same place, gas-fitter, John Bell Muschamp, of 68, Upper Thames Street, in the City of London, paper manufacturer, and Newton Wilson, of 144, High Holborn, in the co. of Middlesex, sewing-machine manufacturer, for "*Improvements in the manufacture of carburetted hydrogen or luminous gas.*" Sept. 24, 1868.

2932.—William Dunn, of 3, Hope Terrace, Newington Green, late of Little Cross Street, Islington, for "*Dispensing with soldering and usual fastenings in the fitting up or repairing of pipes and tubes.*" Sept. 24, 1868.

2933.—Ephraim Death and John Ellwood, both of Leicester, engineers and co-partners, for "*Improvements in pumping apparatus.*" Sept. 24, 1868.

GRANT OF PROVISIONAL PROTECTION.

2727.—Thomas Butterworth, of 18, Mumps, Oldham, in the co. of Lancaster, engineer, for "*An improved pump suitable for lubricating and for other purposes.*" Sept. 4, 1868.

NOTICES TO PROCEED.

1459.—David Pitcairn Wright, of the firm of Wright and Butler, of Birmingham, in the co. of Warwick, lamp manufacturers, for "*Improvements in the manufacture of a certain description of taps.*" May 5, 1868.

1548.—Thomas Shinton, of Blaina, near Newport, in the co. of Monmouth, for "*Improvements in forming the ends and joints of pipes.*" May 12, 1868.

1598.—Alfred Vincent Newton, of 66, Chancery Lane, in the co. of Middlesex, mechanical draughtsman, for "*Improvements in liquid-meters.*" A communication. May 15. 1868.

1624.—William Needham and James Kite, both of Vauxhall, in the co. of Surrey, engineers, for "*Improvements in preparing filtering surfaces for the depuration of fluids.*" May 18, 1868.

1645.—Claude Ludovic Taverdon, of 60, Boulevart de Strasbourg, Paris, practical engineer, and Jules Moret, of Sèvres, near Paris, in the empire of France, merchant, for "*An improved lift and force double-action pump, giving a continuous and regular supply of liquid.*" May 20, 1868.

1816.—John Henry Johnson, of 47, Lincoln's Inn Fields, in the co. of Middlesex, gentleman, for "*Improvements in pipe-joints.*" A communication. June 3, 1868.

1980.—Charles Hengst, of St. George's Terrace, engineer, and Henry Watson, of Grove Road, gas-fitter, both of Fulham, in the co. of Middlesex, for "*An improved mode of and means for manufacturing gas for lighting and heating purposes.*" June 18, 1868.

2667.—William Strang, of Glasgow, in the co. of Lanark, N.B., for "*Improvements in arrangements and apparatus for dealing with sewage.*" Aug. 28, 1868.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1958.—William Edward Newton, "*An improved water-meter, which may be employed as a water, steam, or gas engine.*" July 28, 1865.

1996.—James M'Ewan and William Neilson, "*Improvements in the raising, lifting, or drawing and forcing water and other liquids, and in the apparatus and means employed therefor.*" Aug. 2, 1865.

2043.—Adrienne Anastasie Foubert, "*Improvements in apparatus for regulating the passage or flow of steam, water, and other fluids.*" Aug. 7, 1865.

2095.—Henry Woodward, "*Improvements in carburetting coal gas and manufacturing artificial gas, and in the machinery or apparatus employed therein.*" Aug. 12, 1865.

2191.—John Moule, "*An improvement in the treatment of tar and other substances suitable to be used in the manufacture of paint, and for other purposes.*" Aug. 25, 1865.

2199.—Robert Gordon Rattray, "*Improvements in apparatus for supplying regulated or measured quantities of water.*" Aug. 26, 1865.

2270.—Stephen Kettle, "*Improvements in water-closet apparatus, urinals, and the like, and appliances thereto.*" Sept. 4, 1865.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

2265.—Charles Greaves, "*Improvements in apparatus for preventing waste of water from service-pipes or cisterns.*" Sept. 12, 1861.

2316.—Frederic Barnett, "*An improvement in the light given by street and other lamps by means of reflectors in white earthenware, china, and all enamel materials, in conjunction with an improved chimney to draw up the exhalations and smoke of all lighting materials.*" Sept. 17, 1861.

2342.—John Hays Wilson, "*Improvements in pumps, chiefly applicable to ships lift-pumps.*" Sept. 19, 1861.

2344.—John Graham, "*An improved double-acting force or lift pump for ships, fire-engines, and other purposes.*" Sept. 19, 1861.

The Birmingham Gas Companies.—Both the gas companies in Birmingham (the Birmingham Gaslight and Coke Company and the Birmingham and Staffordshire Gaslight Company) have had to take from their reserve-funds in order to make up their customary dividends for the past half year. The first-named company take £2300, and the other nearly £5000. After this has been done the reserve of the first will stand at £26,500, and of the Birmingham and Staffordshire at £55,700. This state of things has been brought about conjointly by a reduction in the price of gas, by an increase in the price of coal used in order to increase the illuminating power, and by a reduction in the value of the residuals. In respect of the Birmingham and Staffordshire Company, the reduction in the price of gas, which began on the 1st of July, last year, has occasioned a deficiency of £3576 upon the half year. The coke realized less by £5556, and the other residual products and fittings £1153, at the same time that an increase in poor and other rates of £863 took place. All the works of the two companies are reported in a thoroughly efficient state.—*The Engineer.*

Miscellaneous News.

OTTOMAN GAS COMPANY, LIMITED.

The Ordinary Half-Yearly Meeting of the Shareholders of this Company was held at the City Terminus Hotel, Cannon Street, on Tuesday, Sept. 22—EDWARD HORNER, Esq., in the chair.

Mr. A. J. KING (the secretary) having read the advertisement convening the meeting, the following report and statements of account were presented:—

Balance-Sheet, June 30, 1868.

Dr.		*Cr.*	
To Capital	£30,000 0 0	By Plant	£40,336 0 6
Debentures	13,450 0 0	Concession and preliminary expenses	16,888 9 10
Sundry creditors	2,237 11 3	Stocks	4,045 13 6
		Amount owing for public lights	2,288 17 4
		Sundry debtors	1,344 6 2
		Cash	515 11 2
		Office furniture	124 10 3
		Profit and loss. £160 14 2	
		Less balance brought forward 16 11 8	144 2 6
	£65,687 11 3		£65,687 11 3

Profit and Loss Account, June 30, 1868.

Dr.			*Cr.*		
To Cost of coals	£682 16 6		By Gas-rentals—		
Wages and expenses, Smyrna	763 13 4		General consumers	£1,678 2 0	
		£1,446 9 10	Public lights	37 2 8	
Interest on debentures		403 10 0	Coke and tar	243 5 8	
Interest and discount		8 8 0			1,958 9 11
Depreciation of meters at rental		18 13 9	Net profit on fittings		70 15 0
Wear and tear, and renewals		37 3 11	Transfer fees		1 2 6
Exchange		47 16 1	Profit and loss		160 14 2
Rent, salaries, auditors, printing, stationery, and office expenses, London		229 0 0			
		£2,191 1 7			£2,191 1 7

The CHAIRMAN, in moving the adoption of the report, expressed his regret that the directors were not able to lay before the shareholders a more satisfactory state of affairs. He still, however, believed in the ultimate success of the undertaking, and was sanguine that the company would be able to make satisfactory arrangements with the newly appointed municipality of Smyrna with reference to the public lighting. This was all that was needed to put them in a good business position, because the capital of the company was so small that the present revenue was sufficient to meet their expenses. Negotiations had already been had with the municipal authorities on the subject, and there were many persons in the place who were anxious to have the public lighting recommenced, but as yet there had not been time to complete the necessary arrangements. The board had taken steps to reduce the expenses in Smyrna; and so firm was their conviction of the soundness of the concern, that several of the directors had increased their interest in the company by taking debentures to a considerable amount.

Mr. DEFFEL seconded the motion.

A PROPRIETOR inquired whether there was any prospect of the arrears for public lighting being discharged.

The CHAIRMAN said that question formed a part of their negotiations with the municipality, and he hoped that, if they did not get the money paid down, they would be able to arrange for an increased charge per lamp for a limited period. He might remind the meeting that the works of the company were equal to the supply of the whole of the town; and that, if they had to resume the public lighting, they could do it without any additional expense for retort or gasholder room.

The motion was put and carried unanimously, and a vote of thanks was given to the directors, which was acknowledged by the CHAIRMAN, and the proceedings terminated.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The Ordinary Half-Yearly General Meeting of this Company was held at the City Terminus Hotel, Cannon Street, on Thursday, Sept. 24—ERASMUS WILSON, Esq., F.R.S., in the chair.

The SECRETARY read the advertisement convening the meeting, and the chairman affixed the seal of the company to the register of proprietors.

The following report and statements of account were then presented:—

The directors have to report the satisfactory progress of the company's business during the half year.

The works and plant are in a state of efficiency. The reports of Dr. Letheby, and of the chemical inspectors of the various parishes supplied by the company, have been satisfactory as to purity and illuminating power.

The balance-sheet for the half year to the 30th of June last, and appended to this report, shows the financial position of the company. The profits for the half year are £5456 5s. 1d., which, together with £280 13s. 9d., the unappropriated profit of the preceding half year, make the available balance £5736 18s. 10d. Out of this sum the directors recommend the declaration of a dividend at the rate of 6 per cent. per annum on the preference capital, a dividend at the rate of 7 per cent. per annum on the ordinary 7 per cent. capital, and a dividend at the rate of 10 per cent. per annum on the original capital, all free from income-tax, and the balance of £158 18s. 10d. to be carried forward to the profit of the succeeding half year.

Profit and Loss, Half Year ending June 30, 1868.

Dr.			*Cr.*		
To Amount for coals carbonized		£8,515 18 8	By Private rental, Lady Day quarter	£10,371 3 11	
Lime and oxide		130 5 1	Public ditto, ditto	1,332 12 5	
Trade charges		778 4 10	Private rental, Midsummer quarter	5,148 4 3	
Works renewal account		697 16 2	Public ditto, ditto	1,246 12 8	
Mains renewal account		348 17 0			18,098 13 3
Rents, rates, and taxes		736 0 1	Meter-rental		300 16 5
Directors and auditors fees		530 0 0	Coke made for sale	£3,416 14 6	
Salaries and collectors commission		1,021 15 0	Breeze ditto	134 3 1	
Wages		2,682 8 1	Tar ditto	94 2 7	
Interest on loans		624 4 2	Sundries	87 17 1	
Bad debts and allowances on collection		182 15 2			3,732 17 3
Law charges		194 2 4	Sulphate of ammonia—net profit		86 7 9
Retort account		500 0 0			
		£16,762 9 7			
Profit		5,456 5 1			
		£22,218 14 8			£22,218 14 8

Balance-Sheet, June 30, 1868.

Dr.			*Cr.*		
To Proprietors for paid-up capital—			By Amount for plant, &c.		£147,757 16 1
5000 preference shares, at £10 per share		£50,000 0 0	Works renewal (suspense account)		1,137 4 10
5000 original shares, at £10 per share		50,000 0 0	Mains renewal (suspense account)		1,991 16 2
10,000 ordinary 7 per cent. shares, at £10 per share	£100,000 0 0		Law charges (suspense account)		100 0 0
Less amount uncalled	50,922 0 0		Freehold land		8,886 17 8
		49,078 0 0	Preliminary expenses		3,150 0 0
Loans on debenture		24,610 0 0	Retort account		1,570 14 9
Amount due to sundry persons		5,949 1 0	Stock on hand		9,099 19 9
Contingent-fund—			Amount due from sundry persons		1,751 17 5
Uninvested	£1,013 16 2		Invested in Consols from contingent-fund		164 5 5
Invested	164 5 5		Private gas and meter rental, Midsummer quarter		5,299 2 6
		1,178 1 7	Arrears		527 11 8
Profit unappropriated		280 13 9	Public rental (Michaelmas quarter), fittings, and arrears		1,499 14 9
		£181,095 16 4	Balance at bankers		3,615 0 5
Profit and loss		5,456 5 1			
		£186,552 1 5			£186,552 1 5

Appropriation of Balance.

Balance brought forward from last account	£ 280 13 9	Dividend on preference share capital, at 6 per cent.	£1,500 0 0	
Ditto of profit and loss	5,456 5 1	Ditto on ordinary 7 per cent. capital, at 7 per cent.	1,578 6 8	
		Ditto on original share capital, at 10 per cent.	2,500 0 0	
				£5,578 6 8
		Balance to be carried to next account		158 12 2
	£5,736 18 10			£5,736 18 10

The CHAIRMAN moved the adoption of the report, and said the business of the company was progressing as satisfactorily as they had any right to expect; the works and plant were in a state of efficiency; and the reports of Dr. Letheby, the chemical adviser, were uniformly to the effect that the gas supplied was of a high standard of illuminating power and purity.

Mr. A. Williams seconded the motion, which was put, and carried unanimously.

On the motion of Mr. Glaisher, the dividend recommended in the report was declared.

Thanks were then voted to the directors, auditors, and officers of the company, and the proceedings terminated with the usual compliment to the chair.

METROPOLIS GAS SUPPLY.

Court of Common Council—Thursday, Sept. 17.

At the Meeting of the Court this day,

The Town-Clerk read a communication received from the Board of Trade, announcing that Dr. Letheby had been appointed by that board chief gas examiner, Messrs. Evans, Patterson, and Pierce, gas referees, and Mr. C. Parkes auditor of accounts, under the City of London Gas Act, 1868.

Deputy De Jersey moved that the communication be referred to the Special Gas Committee, and that it be referred to them to confer with the Commissioners of Sewers as to the appointment of a gas examiner or gas examiners, and to select such persons for the approval of the court, and to consider the salary of the person or persons so appointed. He said he need hardly tell the court the nature of the provisions of the Act. Under it the corporation were empowered to make certain appointments, and he now asked that the matter should be referred to the Special Gas Committee, to consider what steps should be taken. He might mention that the subject had been brought before the Commissioners of Sewers, and they were of opinion that the course which he suggested was the right one.

Mr. Dresser Rogers, in seconding the motion, called attention to the fact that under the terms of the Act of Parliament the appointment of gas examiner was in the hands of the corporation, and he hoped that they would carefully exercise the power thus entrusted to them. He felt it was very important that the carrying out of the provisions of the Act should be jealously watched. It had been mentioned to him that the Mr. Evans whom the Board of Trade reported as having been appointed by them one of three gas referees who, under the 29th clause of the Act, were to be nominated as quickly as may be after the passing of the Act, and who should be impartial persons, was the chief engineer of the Chartered Gas Company, a company supplying a portion of the City, and which company was placed by the committee of the House under the provisions of the Act.

The motion was put and carried.

City Court of Sewers—Guildhall, Tuesday, Sept. 22.

At the Meeting of the Court this day—Deputy De Jersey in the chair,

Dr. Letheby presented the following quarterly report of the illuminating power and chemical quality of the gas supplied to the City of London:—

In the course of the quarter which expired at the end of August last there were 684 examinations of the illuminating power of the gas supplied to the City by the three gas companies, and on no occasion was the gas below the standard specified in the Act of Parliament. The general summary of the results is as follows:—

Illuminating Power in Standard Sperm Candles.

	Great Central Gas.	Chartered Gas.	City Company's Gas.
Maximum	15·18	15·59	15·25
Minimum	12·21	12·16	12·37
Average	13·50	13·84	13·85
Average of the last five years	13·91	13·77	13·80

Every recorded result was the mean of ten observations; and the gas was burnt at the rate of 5 cubic feet per hour, from a Sugg's Argand burner of 15 holes, with a 7 inch chimney.

With regard to the chemical quality of the gas, I have to report that the amount of sulphur has been excessive on 9 occasions out of 60 in the Great Central gas, on 24 out of 61 in the Chartered gas, and on 10 out of 58 in the gas of the City Company. The particulars of these examinations are as follows:—

Grains of Sulphur in 100 Cubic Feet of Gas.

	Great Central Gas.	Chartered Gas.	City Company's Gas.
Maximum	27·09	23·90	25·11
Minimum	8·85	14·27	10·56
Average	14·62	19·03	17·24
Average of the last four years	21·18	17·85	19·11

The marked decrease in the average proportion of sulphur in the gas of the Great Central Company is evidently due to the improved method of purification, and I have no doubt that, on each of the 9 occasions when the quantity of sulphur exceeded the amount sanctioned by Parliament, there was something amiss with the effective action of the lime purifiers.

The gas of all the companies has been constantly free from sulphuretted hydrogen; but the presence of ammonia has at all times been discoverable, by means of moistened turmeric paper, in the gas of the Chartered and Great Central Companies.

And now, gentlemen, in concluding this, which is my last report of the quality of the gas supplied to the City under the provisions of the Metropolis Gas Act of 1860, I have to resign the appointment which I have held as your gas analyst for nearly seventeen years—the Board of Trade having done me the honour of electing me to the office of chief gas examiner under the provisions of the City of London Gas Act, 1868; and I cannot but regard this as a mark of respect for you, not merely because the Act applies to the City, and has been obtained by your exertions, but also because it is here, and here only, in all England, that for nearly seventeen years there has been a constant and systematic examination of the gas supplied to the public. I may remind you, also, that, in the performance of this duty, much useful knowledge has been acquired, and many valuable facts have been recognized, so that, while assisting to advance the technical branch of the subject, you have been able to extend the basis of useful legislation; for there can be no doubt that the success of your efforts to improve the quality of the City gas, and to cheapen its supply, has been in a great measure due to the importance of the facts which you have thus acquired.

And, lastly, I am desirous of saying that, as it has hitherto been my constant endeavour to deal fairly and justly with all the interests committed to my charge, as your referee and gas analyst, so will it be in the future; and you will permit me to thank you for the confidence you have reposed in me during so long a period of service. (Signed) H. Letheby.

Deputy Farrar asked what was the meaning of the term "standard candle" used in the report.

Dr. Letheby replied that it was a sperm candle of six to the pound, burning at the rate of 120 grains per hour.

Deputy Burnell asked whether any attention had been paid to the specific gravity of the sperm that was used in the standard candle.

Dr. Letheby said there was nothing in the Act of Parliament defining the specific gravity of the sperm.

Deputy White suggested whether, as it was a very important question—the standard of illumination—some proceedings ought not to be taken by the commission for the purpose of ascertaining the quality of the sperm used in the standard candle.

Dr. Letheby said when the new Act of Parliament—the City of London Gas Act, 1868—came into operation on the 1st of next month, the referees would be empowered to consider the whole question of the means of testing, both as regarded the quality of the testing material, and all the instruments made use of. No doubt, therefore, they would direct their attention to the matter of the quality of the sperm. He might, however, observe that sperm, being a natural product, was remarkably uniform in its composition, and would give, in all probability, a uniform light under uniform circumstances. But, at the present time, sperm was mixed with other materials in the construction of the candle, and occasionally those materials were of a nature to reduce the natural illuminating power of the sperm, as when stearic acid was used, and at other times to increase the value of the light, as when paraffin was used. In the one instance it would be in favour of the gas companies, and in the other against them, and in favour of the public. It was, therefore, a matter of so much importance, that doubtless it would receive the careful attention of the referees.

Mr. Pedler gave notice that, at the next meeting of the commissioners, he would move a vote of thanks to Dr. Letheby, for the valuable services he has rendered the commission in his office as gas analyst.

Metropolitan Board of Works—Friday, Sept. 25.

At the Meeting of the Board this day—Sir J. Thwaites in the chair,

Mr. Smith (solicitor) laid before the board a letter from Mr. Herbert, stating that the Board of Trade have, pursuant to the City of London Gas Act, 1868, appointed Dr. Letheby to be chief gas examiner; Mr. F J. Evans, Mr. J. H. Patterson, and Mr. J. S. Pierce, gas referees; and Mr. C. Parkes, auditor of the accounts. He also presented an analysis of the provisions of the City of London Gas Act, which was ordered to be printed for the information of the members. He stated that it would be necessary for the board to take into consideration what course they would take before the auditor under the 79th section of the Act. He further called attention to the 109th section of the Chartered Gas Company's Act, and recommended that that and clauses 21, 41, 44, 50, 51, 55, 63, 66, 71, 72, and 88, should be referred to the Special Gas Committee for examination and report.

Mr. Richardson asked whether any opportunity would be given to the board to reconsider their decision upon the gas question generally, and of determining whether they should take any steps for the protection of the gas consumers of the metropolis.

The Chairman said all these points had already been referred to the committee.

Mr. Richardson said he thought it very desirable that the committee should examine into all the details of the questions, and that the board should have the opportunity of reconsidering the matter.

Mr. Freeman said they had first of all to settle the question of principle, whether any step at all should be taken by them. He thought a public board, and not a committee, was the proper place to discuss that point.

The recommendations of the solicitor were then adopted.

ON SULPHOCYANIDE OF AMMONIUM.

By Dr. T. L. Phipson, F.C.S., &c.

[A paper read before the British Association, at Norwich, Section B.]

This is a salt which can be obtained in large quantities from the products of the distillation of coal. It accompanies the other compounds of ammonia in the ammoniacal liquor of gas-works.

In several works it is made to yield its ammonia for the production of sulphate of ammonia; for this purpose it is distilled with lime after the carbonate and sulphide of ammonium have been distilled.

For many years I have noticed that the sulphate of ammonia supplied to commerce for agricultural and other purposes often contains a small quantity of sulphocyanide, say from 2 to 4 per cent., but latterly a much larger quantity, which increases its yield in nitrogen when submitted to analysis without bestowing upon the product a corresponding value in an agricultural sense. For though the nitrogen of the ammonium in the sulphocyanide can be utilized like that in sulphate of ammonia, that contained in the form of sulphocyanogen escapes. In other terms, only one-half of the nitrogen in sulphocyanide of ammonium is available in the manufacture of artificial manures, since the other half is partly volatilized as sulphocyanhydric acid, and partly decomposed by the heat of the reaction, which is sometimes great enough to ignite the bisulphide of carbon resulting from the decomposition.

Within the last twelve months the quantity of sulphocyanide of ammonium present in some kinds of commercial sulphate of ammonia appears to have increased considerably, and several samples which I have examined recently have yielded upwards of 75 per cent. of this salt; in fact, they were not sulphate of ammonia at all, but impure sulphocyanide of ammonium.

I found it necessary some time ago to discover a means of estimating rapidly and with accuracy the amount of this product when mixed with sulphate and chloride of ammonium and the various organic matters which usually accompany the commercial products.

Sulphocyanide of ammonium can be separated with tolerable accuracy from the sulphate by means of alcohol, in which it is freely soluble; but this method will not apply when chloride of ammonium is present also, nor does it give the sulphocyanide in a convenient form for weighing.

A method which I have satisfied myself gives very accurate results, and is sufficiently rapid, consists in dissolving a given weight of the product in water, filtering, rendering the solution rather acid, and precipitating the sulphocyanogen as an insoluble salt of copper by the addition of equal equivalents of sulphate of protoxide of iron and sulphate of copper. The whole of the sulphocyanogen is eliminated in this manner: The copper compound is received upon a weighed filter, dried at 100° Cent., and weighed. It is anhydrous, and contains 2 equivalents of copper, 2 of carbon, 2 of sulphur, and 1 of nitrogen—$Cu_2C_2NS_2$.

Having prepared a certain quantity of pure sulphocyanide of ammonium, I took the opportunity of studying some of its properties. Of these experiments I will mention only those which appear not to have been made before.

Sulphocyanide of ammonium dissolves copiously in water and in alcohol, and these solutions offer considerable interest. In the first place, in dissolving rapidly in water this salt produces a greater degree of cold than any other compound with which I am acquainted. About half a litre of hot water being poured upon 500 grammes of the impure salt, I was surprised, on stirring the whole together, to find that hoar frost appeared immediately on the external surface of the vessel. The temperature of the solution was found to be between 2° and 3° below zero, that of the hot water used 96°, showing that the temperature had sunk 98° or 99° Cent., in the space of a few seconds.

A substance which absorbs so much heat whilst dissolving would be expected to give out again much caloric when it crystallizes, and such is the case. With saturated solutions the crystallization is accompanied on this account with some curious phenomena. As one large crystal forms the adjacent crystals are dissolved again by the heat produced, giving rise to a series of rapid movements in the liquid and along its surface. Some of

these vibrations spread along the entire surface with the rapidity of lightning, and continue at short intervals until the whole liquid suddenly solidifies.

From concentrated solutions sulphocyanide of ammonium crystallizes in large transparent plates of a slightly pearly aspect. These plates appear to be formed of long prismatic needles intimately united, and are best obtained with very concentrated solutions. When weaker solutions are caused to crystallize, right rectangular prisms are formed. They are often of great length; I have occasionally obtained them 2 or 3 inches long.

The alcoholic solution of sulphocyanide of ammonium presents in the highest degree the peculiar phenomena of *supersaturation*. A saturated hot solution after cooling will remain liquid for hours, probably for days together. But if the liquid is stirred with a glass rod it is immediately transformed into a mass of small crystalline plates. When, instead of a glass rod, a minute crystal of the salt itself is thrown into the supersaturated solution after it has become quite cold, at the same instant magnificent rectangular plates, having the four faces of the octahedron, begin to form rapidly upon the surface, and the vessel is soon filled with splendid crystals. The supernatant liquid separated from these can be made to deposit still a considerable quantity of small crystalline plates by being stirred rapidly for a minute or two with a glass rod.

A concentrated aqueous solution of sulphocyanide of ammonium has no action upon sulphur; but it dissolves a considerable quantity of iodine, and when the dark-coloured solution is diluted and heated, the yellow compound called "sulphocyanogen," is precipitated, and the liquid becomes colourless. Bromine acts in a similar manner. Each drop of bromine on falling into the warm solution produces a hissing noise; on boiling the liquid the sulphocyanogen compound is precipitated. These two precipitates are insoluble in alcohol and soluble in sulphuric acid like that which is produced by chlorine.

The action of chlorine gas upon solutions of sulphocyanide of ammonium is very remarkable. If the solution is dilute the sulphur is gradually oxidized to sulphuric acid, and no precipitate is formed. If concentrated, a dense precipitate of sulphocyanogen occurs after a little while. It is difficult to obtain the whole of the cyanogen in this form, even when the liquid is kept near its boiling point the whole time. When the decomposition is complete, and the liquid separated from the precipitate is evaporated, it yields chloride of ammonium. The action of chlorine on this solution is yet incompletely known. The composition of the so-called "sulphocyanogen" has been much discussed. For some time this precipitate was considered to be the radical of sulphocyanhydric acid, but it was afterwards found to contain hydrogen and oxygen. The composition assigned to this substance by Laurent and Gerhardt—namely, 3 equivalents of cyanogen, 1 of hydrogen, and 6 of sulphur—appears to be inadmissible. The results of my analysis of

Share List of Metropolitan Gas Companies.

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Price per Share.
	£		£ s. d.	£ s. d.	£
8000	10	Anglo-Romano	10 0 0	10 0 0	11 — 12
5000	20	Bahia (Limited)	20 0 0	3 0 0	14 — 15
1000	20	Do., preference	20 0 0	10 0 0	20 — 22
750	20	Do., do., redeemable	20 0 0	10 0 0	20 — 21
40000	5	Bombay (Limited)	5 0 0	4 10 0	3⅜— 4
10000	5	Do., third issue	4 0 0	4 10 0	2¾— 3
10000	20	British (Limited). (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge, & Holywell.)	20 0 0	10 0 0	28 — 29
12000	50	*Chartered*	50 0 0	7 0 0	54 — 56
6000	50	Do.	45 0 0	7 0 0	47 — 49
10000	20	*City of London*, A shares	20 0 0	9 0 0	25 — 26
10000	10	Do., B shares	10 0 0	4 0 0	6 — 7
9629	10	Do., new shares	10 0 0	9 0 0	12 — 13
25000	25	City of Moscow (Limited)	25 0 0	nil.	5½— 6½
17490	25	*Commercial*	25 0 0	10 0 0	36 — 38
20000	20	Continental Union	20 0 0	4 0 0	15½— 16
10000	20	Do., preference	20 0 0	7 0 0	20 — 20¼
5000	10	*Crystal Palace District*	10 0 0	10 0 0	14 — 15
5000	10	Do., preference	10 0 0	6 0 0	12½— 13
10000	10	Do., new shares	2 10 0	7 0 0	2½— 3
4000	50	*Equitable*	50 0 0	10 0 0	70 — 72
4000	25	Do., new shares	25 0 0	10 0 0	35 — 36
23406	10	European (Limited)	10 0 0	11 0 0	15 — 15½
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	11 0 0	7½— 7¾
20000	10	*Great Central Gas Consumers*	10 0 0	10 0 0	14 — 14½
5000	10	Hong Kong (Limited)	10 0 0	5 0 0	8 — 10
26000	50	*Imperial*	50 0 0	10 0 0	70 — 72
26000	10	Do., new shares	1 0 0	10 0 0	1⅞— 2
26000	12½	Do., new shares	3 0 0	7 0 0	4¼— 4½
1300	100	Do., bonds	£100	10 0 0	175 —180
28000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	16 0 0	99¼—100

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Price per Share.
	£		£ s. d.	£ s. d.	£
400	100	Imperial Mexican (Limited)	100 0 0	nil.	
200	100	Do., new	100 0 0	nil.	
3000	40	*Independent*	40 0 0	10 0 0	52 — 53
3000	10	Do.	10 0 0	5 0 0	7 — 9
3000	20	Do.	12 10 0	7 10 0	13 — 14
7133	50	*London*	50 0 0	10 0 0	66 — 68
5610	25	Do., 1st preference	25 0 0	6 0 0	26 — 28
503	50	Do., 2nd preference	50 0 0	6 0 0	
214	50	Do., 3rd preference	50 0 0	6 0 0	
£18781		Do., 1st preference stock		6 0 0	
£11828		Do., 2nd preference stock		5 0 0	
12000	5	Malta and Mediterrancan (Limited)	5 0 0	5 0 0	3½— 4
6000	5	Do., preference	5 0 0	7 0 0	.. — 5
30000	5	Oriental (Calcutta)	5 0 0	9 0 0	6¾— 7¼
30000	5	Do., new shares	1 0 0	9 0 0	1¼— 1⅝
10000	5	Ottoman (Limited)	5 0 0	nil.	1⅝— 2¼
10000	10	Parà (Limited)	10 0 0	6 0 0	8¼— 9
27000	20	*Phœnix*	20 0 0	10 0 0	29 — 30
3600	100	Do., new	35 0 0	7 10 0	37 — 38
144000	Sk.	Do.	100 0 0	5 0 0	75 — 77
5000	20	*Rateliff*	20 0 0	10 0 0	23 — 25
	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	23 — 25
6959	5	Singapore (Limited)	5 0 0	4 0 0	
2000	5	Do., preference	5 0 0	7 10 0	
		Shanghai			
4800	50	*South Metropolitan*	50 0 0	10 0 0	73 — 75
	12½	Do., new shares	12 10 0	10 0 0	18 — 19
15000	10	*Surrey Consumers*	10 0 0	10 0 0	13¾— 14¼
10000	10	Do., new	6 0 0	10 0 0	8 — 8¼
9000	5	United General (Limerick)	5 0 0		2 — 2⅛
10000	10	*Victoria Docks*	5 0 0	6 0 0	
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	10 — 12
2989	10	Do.	10 0 0	7 10 0	10 — 10½
316	10	Do.	6 10 0	7 10 0	
1128	10	Do.	3 0 0	7 10 0	
29000	10	Western (Limited) A shares	10 0 0	10 0 0	14 — 15
10000	10	Do., B shares	6 0 0	10 0 0	8 — 9
10000	10	Do., C shares	6 0 0	10 0 0	8 — 9
20000	10	Do., D shares	1 0 0	10 0 0	1½— 2
8000	5	*West Ham*	5 0 0	7 10 0	.. — 7¼
6000	5	Do., new shares	5 0 0	7 10 0	.. — 7¼
551	10	West London Junction (Limited)	10 0 0	6 0 0	
520	10	Do., preference	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1 (g.m.b.)	3 12 6	2 13 7	2 6 6	3 5 0	3 5 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2½ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	5 15 0	6 0 0	7 0 0
Tank-plates, ¼ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1¼ in.	1½ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 3
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 3-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

Haswells, Nettlesworth Primrose, and South Pelaw	6s. 6d.
Felling, Framwell Gate, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	6 9
Burnhope, Craghead, Charlaw, Derwent, East Castle, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, Pelaw Main, Ravensworth, Seaham, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 0
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	7 3
Brancepeth, Dean's Primrose, Londonderry Gas, New Pelton, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	7 6
Ramsay's Newcastle Cannel	15 0
Wigan Cannel (at Liverpool)	17 0
Scotch Cannel:—	
Boghead (at Leith)	42 6
Muirkirk	27 0
Kirkness, best (at Burntisland)	28 6
Capeldrae, 1st quality (at ditto)	28 6
Ditto, 2nd ditto (at ditto)	18 6
Cowdenbeath	12 0
Lesmahago (at Glasgow)	31 6
Ditto (at Granton)	32 6
Arniston	27 6
Wemyss (f.o.b.)	22 6
Haywood, Wilsontown (at Granton)	23 0
Pirnie, or Methill	17 0
Lothian's Cannel (at Leith)	23 0
Myles' Cannel	23 6
Lochore Parrot (at Burntisland)	28 0
Lanemark (at Glasgow)	16 0
Elphinstone Tower (at Leith)	20 0
Coppa Cannel (on rail at Birkenhd.)	14 9
Ditto ditto (ditto at Connah's Quay)	14 3

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—

Chatham and Rochester	5 6
Cork	7s. 6d. to 8 0
Dover, Folkestne, & Ramsgate	6 0
Dublin	8 6
Exeter Quay	7 6
Ipswich	4 6
London (from Leith)	7s. 6d. to 8 0
London (Pool)	6 0
Lowestoft and Yarmouth	4 6
Portsmouth & Southampton	6 3
Plymouth	6 9
Shoreham	6 0
Whitstable	5 6
Weymouth	6 6
Foreign.—Per Keel:—	
Barcelona	£17 10
Bordeaux	13 0
Boulogne and Calais	6 10
Cadiz	13 10
Cronstadt	—
Copenhagen	8 0
Genoa	16 0
Hamburg	£7 15s. to 8 0
Havre de Grace	8 10
Leghorn	16 10
Lisbon	10 10
Rotterdam	8 0
Stettin	10 0
Trieste	14 10
Venice	19 10

SUNDRIES.

Best Nstle. Fire-bks., p. 1000, £2 10s. to	£2 15 0
Cliff's Fire-bks. (at Wortley), p. 1000	2 15 6
Ingham's ditto (at Wortley), p. 1000	2 15 0
Parnley Iron Co.'s Fire-bks. (at Wortley), less discount	2 17 0
Fire-clay Retorts, p. ft. run, 5s. 6d. to	0 7 0
Tough Cake Copper, p. ton	73 0 0
English Pig Lead, p. ton	18 15 0
Welsh Bar Iron (in London), p. ton	6 10 0
Foreign Spelter, p. ton	20 0 0
English Block Tin, p. ton	96 0 0
Banca, p. ton	92 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

this compound correspond with those of Vœlkel, not with those of Laurent and Gerhardt. It should be stated, however, that Charles Gerhardt, to whom organic chemistry owes so many splendid investigations, whilst criticizing Herr Vœlkel's labours on sulphocyanogen, based his own opinion in this case upon an incomplete analysis of the substance in question. The product can be completely purified by washing with hot water and with alcohol should it contain any persulphocyanhydric acid, which seldom occurs, or when it does happen to be present is generally in too small a quantity to affect the results of the analysis. The dried precipitate is anhydrous. It has yielded—

	T. L. P.	Vœlkel.	Calculated.
C	20·00	19·93	19·83
H	0·78	1·08	0·82
N	23·20	23·31	23·14
S	53·00	52·68	52·48
O	3·02	3·00	3·73
	100·00	100·00	100·00

This composition corresponds with the formula $C_8H_2N_4S_8O$, admitted by Herr Vœlkel, and not with that of Gerhardt, which requires 24 per cent. of nitrogen and nearly 55 of sulphur; it contains the elements of 4 equivalents of sulphocyanogen, 2 of hydrogen, and 1 of oxygen—

$$\left.\begin{matrix}4C_2NS_2\\2H\\O\end{matrix}\right\} = C_8H_2N_4S_8O.$$

The insoluble copper salt above mentioned was suspended in boiling water, whilst a current of chlorine gas was passed through the solution, with the expectation of obtaining sulphocyanogen itself, but little or no decomposition ensued; when iodine was substituted for chlorine the copper compound was partially decomposed, with production of some iodide of copper and an odour of iodide of cyanogen.

In conclusion, I may add that as the products derived from sulphocyanide of ammonium are very numerous, it is not impossible that some of them may eventually be applied to some useful purpose; if so it will be satisfactory to know that we possess a supply of this salt as inexhaustible as that of coal itself.—*Chemical News.*

OBITUARY.—Died, on the 22nd instant, at his residence at Hampstead, Sheffield Neave, Esq, one of the Directors of the Bank of England, and for many years chairman of the European Gas Company.

UTILIZATION OF SEWAGE.—A series of experiments have been made at Clichy, on the Seine, near the mouth of the great collector of Asnières, with the view to the solution of the important question of the application of sewage water with regard to sanitary and agricultural considerations. The experiments include the separation of the solid matter by chemical means and the direct application of sewage water without any previous preparation. According to the report made by M. Mille, the engineer entrusted with the experiments, the chemical purification is obtained by means of sulphate of alumina, which precipitates the solid matter held in solution. The cost of this process is said to amount only to two centimes, or less than one farthing per ton, and the value of the solid manure is given at 19 francs (15 shillings) per ton. The direct application of unprepared sewage water by means of irrigation is reported to have yielded excellent results last year. Thus treated, Indian corn gave a crop equal to 4½ tons per acre, while crops of beetroot exceeded 12 tons per acre. The experiments with pumpkins were also eminently successful. A jury appointed to taste the different produce came to the decision that the increased size did not seem to have injured the flavour or other qualities, and that there was no evidence of taste or smell of the process adopted. It should be stated that the quantity of sewage water used in these cases was not greater than that ordinarily supplied by market gardeners to their lands after they have been manured. The experiments commenced at Clichy are to be pursued upon a much larger scale on the plain of Ginnevilliers.

Advertisements.

C. A. S. VICKARY,

(ADMINISTRATRIX TO THE LATE JOHN VICKARY,)

GAS ENGINEER AND CONTRACTOR, IRON AND BRASS FOUNDER,

EXE ISLAND, EXETER,

Tenders her best thanks to the various Gas Companies in **England, Ireland, and Wales,** for the very liberal and kind support received by her lamented husband for the last **22 years,** during which period he erected and extended more than **200 Gas-Works.** She respectfully solicits a continuation of that support, and begs reference to the following testimonial:—

Plymouth and Stonehouse Gaslight Company.

Sir,—I have much pleasure in testifying that the 100-foot Telescope Gasholder and Cast-Iron Tank, erected by you for this Company in 1862, has given the highest satisfaction, and never required the slightest alteration or adjustment since its completion.

Mr. John Vickary. (Signed) PETER ADAMS, Chairman.

The late Mr. Vickary also erected a 100-foot Gasholder and Cast-Iron Tank at **Exeter;** an 80-foot Telescope Gasholder and Iron Tank at **Devonport;** a 90-foot at **Torquay,** &c., &c. At either of these works satisfactory references can be made.

C. A. S. V. begs particular attention to her **Improved Gas-Meters,** both **Wet and Dry,** the materials and workmanship of which are guaranteed of the very best description, and which have gained for her Meters so excellent a reputation.

RETORTS, DIP & ASCENSION PIPES, HYDRAULIC MAIN, CONDENSERS, PURIFIERS, STATION-METERS, GOVERNORS, VALVES, and GASHOLDERS,

Of any size, and every description of article required in Gas-Works supplied.

Mains, Tees, Connexions, and Syphons, from 2 to 12 in., always in stock, and supplied at Scotch prices.
Clay Retorts and Fire-Goods of every description.
Chandeliers and Gas-Fittings of the most modern designs.
Iron Pipe and Fittings, Service Cocks, &c.

Plans, Specifications, and Estimates for the Erection of New Gas-Works of any size furnished.

THE GAS-METER COMPANY

(LIMITED), LONDON,

(Successors to CROLL, RAIT, and CO., LONDON, and WEST and GREGSON, OLDHAM.)

MANUFACTURE

STATION-METERS & GOVERNORS

At their Oldham Establishment, which has long possessed the reputation of supplying this description of apparatus of the most perfect construction and appropriate design.

CONSUMERS GAS-METERS IN CAST-IRON & TINNED SHEET-IRON CASES.

STREET GOVERNORS, PRESSURE and EXHAUST REGISTERS, TEST GASHOLDERS,

AND EXPERIMENTAL GAS APPARATUS GENERALLY.

For information, &c., apply to

W. ARCHER, Manager, Meter Factory, OLDHAM;

OR TO

GEORGE RAIT, Managing Director, KINGSLAND ROAD, LONDON.

WANTED, a re-engagement as MANAGER of a country gas-work (with or without exhauster); 20 years experience. Is thoroughly acquainted with the working and setting of clay or iron retorts; also with alterations or erection of works.
Testimonials from past or present employers.
Address "WIGAN," care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS COMPANIES.

WANTED, by a young Man, age 25, a situation as SMITH and GAS-FITTER. Can lay mains and services. Has had seven years experience in the trade. Good references if required.
Address C. W., 32, Henry Street, Kennington Lane, VAUXHALL.

WANTED (Continent or England), an engagement as Engineer, Manager, or Secretary of a gas-work. Superior knowledge of retort-building. Corresponds and speaks French, also a little Italian.
Address ENGINEER, 15, Annette Road, HOLLOWAY, N.

WANTED, a situation as working FOREMAN in a gas-work. Can undertake to fix retorts, lay mains and services, and do other general repairs. Can have 18 years character from last situation.
Address W. H., Water-Works, Epsom, SURREY.

WANTED, a second-hand Station- METER to pass 3000 cubic feet per hour, and a Governor for 6-in. main. Both to be in good condition, fit for use, and if provided with valves and connexions will be preferred.
Address, giving full particulars and stating prices, to the SECRETARY of the Gas Company, RICKMANSWORTH.

WANTED, a re-engagement as MANAGER of a gas-work. Can fix retorts, lay mains and services, fix meters, and take indices. Thoroughly understands all the general duties required in a gas-work. Aged 30. No objection to go abroad. Good references.
Address D. D., 2, Upper Salisbury Street, Maida Hill, LONDON, N.W.

WANTED, immediately, to proceed to China, two first-class GAS-FITTERS. None need apply but those whose character will bear the strictest investigation.
Apply personally or by letter to Mr. A. A. CROLL, 15, Coleman Street, City, LONDON, E.C.

WANTED, a new or second-hand HYDRAULIC SLIDE-VALVE, with 8-in. or 9-in. connexions.
Particulars and price to be sent to C.E., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, the First Volume of the JOURNAL OF GAS LIGHTING. A liberal price will be paid for it.
Address H. G. H., care of Mr. Roberts, Advertising Agent, 19, Change Alley, CORNHILL.

GAS EXAMINER FOR THE CITY OF LONDON.

THE Corporation, being about to appoint a GAS EXAMINER, under the provisions of the City of London Gas Act, 1868, persons desirous of offering themselves as Candidates are requested to send in their applications, with testimonials as to their qualification for the office, addressed to the Town-Clerk, on or before Tuesday, the 6th of October next.
The person to be appointed will be required to be a competent chemist, skilled in the analysis of gas.
Further information as to salary, &c., may be obtained on application at the Town-Clerk's Office, Guildhall, between the hours of Eleven and Four o'clock.
WOODTHORPE.

FOR SALE.

THE Monaghan Gas Company, Limited, have FOR SALE Two PURIFIERS, each 4 ft. by 4 ft. by 2 ft. 6 in. deep, with wrought-iron covers, and 4 tier wrought-iron grids; One Centre-Valve, with 5-in. connexions for 2 purifiers. Also One Washer, 6 ft. by 3 ft. by 22 in. high. All the above being removed to make room for larger.
Proposals to be addressed to
JOHN HOLMES, Manager and Secretary.

GAS-ENGINES
AND
MATERIALS FOR SALE BY TENDER.

May be seen at the Gas-Engine Company's (Limited) Works,
4, VINE STREET, LAMBETH, S.,
Where Catalogues may be obtained, and also on application to Messrs. KINDER AND KINSEY, 92, CANNON STREET, E.C.

VALUABLE MOTIVE-POWER PATENT
FOR SALE.

For particulars, apply to THOMAS G. BARLOW, Esq., C.E., 42, Parliament Street, WESTMINSTER, S.W.

NOTICE OF REMOVAL.

THOMAS GLOVER and CO. beg to inform gas companies and others that they have removed to their new and more commodious premises, 214 to 222, ST. JOHN STREET, CLERKENWELL GREEN (within two minutes' walk of their old premises), where they shall have increased facilities for executing any orders with which they may be favoured.
They take this opportunity of returning thanks for past orders, and to assure them that they shall continue to manufacture their Meters of the best materials and workmanship, thereby maintaining the well-known high character which their Meter has always had.

FOR SALE, at the Lewes Gas-Works, 1 5-in. Station-Governor, 1 6-in. ditto, 8 6-in. Screw-Handle Valves in good order, sundry 6-in. handy connexions for above, 1 set 5-in. Condensers, 13 Pipes, and 1 10-in. Hydraulic Centre-Valve for four purifiers. All in good condition. Replaced by larger.
Apply to the Manager, Mr. W. WRIGHT.

GAS TAR.

THE Directors of the Hartlepool Gas and Water Company are prepared to receive TENDERS for the purchase of the surplus TAR, at their works at Hartlepool and West Hartlepool, for One, Two, or Three years, from the 12th day of October next. The quantity of Tar will be about 25,000 gallons per annum.
The Directors do not bind themselves to accept the highest or any tender, and no tender will be received after Wednesday, the 7th of October next.
THOS. TREWHITT, Secretary.
Hartlepool Gas and Water Company's Offices,
West Hartlepool, Sept. 24, 1868.

IN CHANCERY.

Re The Companies Act, 1862, and the Matlock Consumers Gaslight and Coke Company, Limited.

TO BE SOLD, by directions of the Official Liquidator of the above-named Company, with the approbation of the Master of the Rolls, in One Lot, by Mr. CHARLES NEWBOLD, the person appointed by the said judge, at Ivatt and Jordan's, New Bath Hotel, Matlock Bath, in the county of Derby, on SATURDAY, the 3rd day of October, 1868, at Four o'clock in the afternoon precisely, the equity of redemption in the newly-erected GAS-WORKS of the above-named Company, situated in the Bakewell Road, near Matlock Bridge, in thorough working order, and consisting of substantial stone-built dwelling-house, retort, purifying, meter, lime, and governor houses, fitted with the necessary working plant for the manufacture of gas; the gasometer and tar tanks, also the mains, services, and meters already made, together with the site of the works, which contains 1 acre 18 perches or thereabouts, and has a frontage to the Cromford and Bakewell turnpike road of about 170 yards.
Particulars whereof may be had gratis of Henry Chatteris, Esq., the Official Liquidator, Gresham Buildings, Basinghall street, London; Samuel Leech, Esq., Solicitor, Derby; J. A. Bush, Esq., Solicitor, Newcastle-upon-Tyne; Messrs. Dubois and Maynard, Solicitors, 3, Church Passage, Gresham Street, London; and of Messrs. Else and Newbold, Auctioneers, Matlock.
JOHN WM. HAWKINS, Chief Clerk.
The mortgagee has promised to concur in the sale.
DUBOIS AND MAYNARD,
3, Church Passage, Gresham Street, London,
Agents for Samuel Leech, of Derby,
Solicitor to the Official Liquidator.

PHŒNIX GASLIGHT and COKE COMPANY.

NOTICE is hereby given, that the adjourned HALF-YEARLY GENERAL MEETING of PROPRIETORS holding previous to Midsummer last £300 paid-up capital and upwards in the said Company, will be held, pursuant to the Act of Incorporation, on WEDNESDAY, the 14th proximo, at Twelve for One o'clock, at the Bridge House Hotel, in the Borough of Southwark, for the purpose of declaring Dividends to Midsummer last, and on other business.
By order of the Court of Directors,
ISAAC ADOLPHUS CROOKENDEN, Secretary.
70, Bankside, London, S.E., Sept. 14, 1868.

POPE & PEARSON'S GAS COAL. We have now the authority of several of the most eminent Gas Engineers of London in stating that our Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles.*
One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.
For further particulars, apply to POPE AND PEARSON, West Riding and Silkstone Collieries, near LEEDS.

TO EXPORTERS OF GAS COAL.

THE PATENT GAS COAL yields 13,800 feet of 32-candle gas, saves 33 per cent. in lime purification, and yields a good coke. Shipped, f.o.b., Rotterdam, at 23s. per ton.
Apply to HAMILTON, DULLENS, and Co., DORDRECHT, Patentees for England, France, Holland, Denmark, and Germany; or to their London Agents, WARNER, WALDUCK, and Co., 11, OLD JEWRY CHAMBERS.

OLD WEMYSS CANNEL COAL.—Yield of gas per ton, 12,896 cubic feet; illuminating power, 31·75 standard candles. Port of shipment, Wemyss.
Analysis and price on application to Mr. WM. CAREY, Manager, Wemyss Colliery, Kirkcaldy, FIFE.

CANNEL COAL.—The West Yorkshire Iron and Coal Company, Limited, beg to draw the attention of Gas Companies to their Cannel, of which the following is the analysis made by W. Huggon, Esq., F.C.S :—

Yield of gas per ton	10,296 cubic feet.
Illuminating power rather over	21 sperm candles.
Yield of coke per ton . . .	12 cwt.

The actual working, as reported by one of the largest gas companies in Yorkshire, gives results still more favourable, viz—

Yield of gas.	10,416 cubic feet.
Illuminating power . . .	21·89 sperm candles.
Coke	The same.

We add from the same source the capabilities of the common gas coal—

Yield of gas.	10,080 cubic feet.
Illuminating power . . .	14 41 sperm candles.
Yield of Coke	13 cwt.

COLLIERIES—WEST ARDSLEY, near LEEDS.
For further particulars, address to the Office of the Company, 15, York Place, LEEDS.

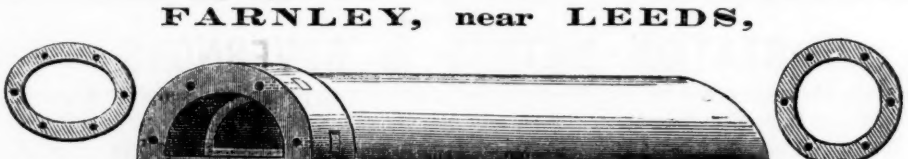
CANNEL COAL.

MESSRS. GRIFFITHS BROTHERS, COPPA COLLIERY, MOLD,
Beg leave to call the attention of Gas Companies to the superior quality of their Cannel for gas-making purposes.
This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.
Ports of shipment—Birkenhead or Connah's Quay.
Waggons supplied for delivery by railway to any part of England or Wales.
For particulars, prices, and rates of freight, apply to GRIFFITHS BROTHERS, Coppa Colliery, Mold, FLINTSHIRE.

IMPORTANT TO GAS AND WATER COMPANIES.

CAST and Wrought Iron Main and Service Pipes and Fittings effectually preserved from Oxidation by
HICKMOTT'S PATENT METHOD.
For particulars apply by letter to J. HICKMOTT, 12, Grove Terrace, Grove Road, St. John's Wood, LONDON

THE FARNLEY IRON COMPANY,
FARNLEY, near LEEDS,



In consequence of the increasing demand for their Retorts, have largely extended this branch of their Fire-Clay Works, and are now prepared to execute the most important orders, either for *home* or *export*, with great punctuality.
The Fire-Clay raised from the Farnley Estate (commonly called the Wortley bed) is unsurpassed by any other known in the district, and is peculiarly well adapted for Retorts, Gas-Ovens, and Fire-Bricks; and the F. I. Co. beg especially to invite those connected with Gas-Works, who have not yet used their Retorts, to be good enough to favour them with a trial.
The F. I. Co. generally hold in stock, for immediate supply, Fire-Bricks of every size and kind—Tiles, Sanitary Tubes, Ornamental Terra-Cotta Ware White Facing Bricks, the White, Buff and Salt-Glazed Bricks, &c., &c.
Prices, Drawings, and all other information may be obtained by applying as above, or to

MR. SUTTON, THE HULL STORES, 46½, QUEEN STREET, HULL.

INVERKEITHING FIRE-CLAY WORKS.

WILLIAM FRASER,

Having recently greatly enlarged these Works, can undertake

CONTRACTS AT LOW PRICES TO ANY EXTENT.

FIRE-CLAY RETORTS WERE FIRST MADE AT HIS WORKS,

And to this Department great attention is paid. Wherever used they have given satisfaction.

He invites attention to the following certificates.

TESTIMONIALS BY SOME OF WM. FRASER'S CUSTOMERS.

I.—*The late* F. LYON, *Esq., Manager and Engineer of the Edinburgh and Leith Gas-Works.*

Edinburgh and Leith Gaslight Company, Edinburgh, March 13, 1855.

Dear Sir,—In reply to yours of the 10th inst., I have to state that we have used Fire-Clay Retorts, made at the Inverkeithing Works, for twenty-five years. For upwards of ten years, I may say, we used them exclusively, and found them give satisfaction. For the last fifteen years we have been getting a part of our clay retorts from other makers. We find yours to stand better than some, and equal to any we have yet tried.—I am, &c., FRAS. LYON.

Wm. Fraser, Esq., Inverkeithing.

II.—JOHN REID, *Esq., Engineer and Manager of the Edinburgh and Leith Gaslight Company.*

Leith, Jan. 29, 1867.

Dear Sir,—In compliance with your request, I hereby certify that I have employed Fire-Clay Retorts of your manufacture, both here and elsewhere, for upwards of twenty-four years, with much satisfaction. I find them capable of sustaining the highest working temperature, under which they last as well as any I have seen used. They are possessed of a special quality, by which the carbon which accumulates inside is very easily removable, without injury to the Retort itself; and the style of workmanship and finish is all that can be desired. I have no objection to your making use of this testimony, so far as you may think it useful in promoting your business elsewhere.—I am, &c., JOHN REID, Engineer and Manager.

Wm. Fraser, Esq., Inverkeithing.

III.—J. Z. KAY, *Esq., Founder and Engineer, Glasgow.*

Phœnix Iron-Works, Glasgow, Oct. 30, 1867.

When I was manager and engineer of the two Gas-Works in Dundee, I used extensively Fire-Clay Retorts manufactured by Mr. Fraser, Inverkeithing. They were also generally used in other works where I acted as consulting engineer. I have pleasure in stating that I consider Mr. Fraser's Retorts to be of a very superior quality, and are not surpassed by any of which I had experience. I have often had occasion to visit his works, and observed that special attention was paid to the manufacture of Retorts, which have been made there, with manifest success, for upwards of forty years. Gaslight Companies may order these Retorts with every confidence that they will give satisfaction. J. Z. KAY.

IV.—*The Late Mr.* DOW, *Manager, Stirling Gaslight Company.*

Stirling Gaslight Company's Office, Jan. 29, 1855.

Dear Sir,—I have much pleasure in testifying to the excellence of the Fire-Clay Retorts made at the Inverkeithing Brick-Works.

I have used them constantly in the Stirling Gas-Works for upwards of eighteen years. *They last with me not less than four years. Some of them are now going the* SIXTH YEAR, and give uniform satisfaction.

From their greater durability, I prefer them to all other retorts I have tried, made by other celebrated makers.

I use those of the circular form, 14 inches diameter and nearly 4 inches thick, 9 feet long, and made in two pieces. Some approve of thinner retorts, and in one piece, but I find that kind suits me best, and order them so accordingly.

I have every confidence in recommending the Inverkeithing Retorts and other fire-clay articles manufactured there.—I am, &c., JOHN DOW, Manager.

Wm. Fraser, Esq., Inverkeithing.

V.—*Messrs.* R. TULLIS & CO., *Auchmuty and Rothes Paper-Mills.*

Auchmuty and Rothes Paper-Mills, Jan. 29, 1866.

We have used Fire-Clay Retorts, got from Inverkeithing, in our Gas-Works for the period of twenty years; and having found them to be of a quality uniformly good, we can confidently recommend them to others, believing them to be the best in the market. R. TULLIS & CO.

VI.—JOHN ROBERTSON, *Esq., Manager, Kinross and Milnathort Gas-Works.*

Kinross and Milnathort Gas-Works, Jan. 29, 1867.

I feel happy at having the privilege to adhibit my name to the certificate in favour of your articles. In regard to the Retorts and other materials manufactured at your works, I can bear ample testimony to their superiority, as I have had the practical experience of working them for the last twenty-seven years.

Mr. Fraser, Inverkeithing. JOHN ROBERTSON, Manager.

VII.—GEORGE AITKEN, *Esq., late Manager of Dalkeith Gas-Works.*

Dalkeith Gas-Works, Aug. 15, 1848.

I intend to be over in the course of a few days to order some more Retorts. You will, perhaps, be surprised to learn that some I got formerly have gone four years, and are still in good condition. They might go longer, with some repair, but I think it better not to risk them. GEORGE AITKEN.

Mr. Fraser, Inverkeithing.

VIII.—A. M'PHERSON, *Esq., Manager, Perth New Gas-Works.*

Your Retorts in one piece give entire satisfaction.

Mr. Fraser, Inverkeithing. A. M'PHERSON, Manager.

IX.—WM. M'KENZIE, *Esq., formerly of Cupar, now of Dunfermline.*

Gas-Works, Dunfermline, Oct. 31, 1867.

Retorts and other materials made at Inverkeithing Fire-Clay Works have been used almost exclusively at these works since their establishment, nearly forty years ago. My own experience of them, here and at Cupar-Fife, extends over fourteen years. These Retorts have invariably given me great satisfaction. They last well, and are quite equal if not superior in every respect to any others which I have used.

WM. M'KENZIE, Manager.

X.—WILLIAM HISLOP, *Esq., Manager of Falkirk Joint-Stock Gas-Works.*

Joint-Stock Gas-Works, Falkirk, March 22, 1854.

The Retorts which we got from you in November, '52, have been cooled down three times, and are still almost as good as that day they were put on.

WILLIAM HISLOP.

XI.—ROBERT DOUGLAS, *Esq., Manager of Gas-Works, Newcastle-on-Tyne.*

Newcastle-on-Tyne Gas-Works, Nov. 12, 1867.

Fire-Clay Retorts and other materials manufactured by Mr. Fraser, Inverkeithing, were very largely used at the Bankside and Vauxhall Stations of the Phœnix Gaslight Company for ten years, when I was superintendent at these stations. I used them previously, when manager of Cupar Gas-Works, Scotland. My experience of them extends to nearly thirty years. His manufactures are of so superior a quality that I can confidently recommend them. It appears to me his fire-clay is peculiarly suitable for making Retorts, and that he has benefited by his lengthened experience. In Scotland, Inverkeithing Retorts have, during forty years, justly maintained a high reputation, and are principally used on the east and centre of that kingdom. They have been introduced into various works, both in England and Scotland, where I was consulted, and always gave satisfaction. RO. DOUGLAS.

XII.—D. HUNTER, *Esq., Superintendent, Phœnix Gas-Works, Greenwich.*

Greenwich Gas-Works, Jan. 31, 1855.

I used the Inverkeithing Fire-Clay Retorts at a work in Scotland, of which I was manager for several years, and can recommend them as equal in durability to any I have yet tried. DAVID HUNTER, Superintendent.

XIII.—J. DOUGLAS, *Esq., Superintendent and Secretary, Portsea Island Gaslight Company.*

Gas-Works, Portsea, Nov. 12, 1867.

I have pleasure in stating that Mr. Fraser's Retorts have been used three years on these works; that I have also had experience of them in other places; that I find them carefully made and well burned; that, from the nature of the material and the manufacture, they are durable and easily heated; and that, while I rank them equal to any, I consider them superior to most that I have tried.

J. DOUGLAS, Superintendent and Secretary, Portsea Island Gaslight Co.

XIV.—*Certificate by Managers and Secretaries of various Gas-Works, in* 1855.

Retorts and other materials manufactured at Inverkeithing Fire-Clay Works have been used in our Gas-Works for the period annexed to our names, and have given every satisfaction. We can confidently recommend them. We believe these Retorts are not surpassed by those manufactured at any other works. They generally last two, but sometimes three years.

Managers Names.	Gas-Works.	Number of Years used.
DAVID TAYLOR	Abernethy	2
WILLIAM GALLOWAY	Alyth	6
ALEXANDER M'EWAN	Auchterarder	8
D. KINNIMOND	Auchtermuchty	10
J. ADAMSON	Anstruther	10
J. ROSS MACVICAR, Secretary	Bridge of Allan	11
A. WATSON	Banff	10
J. G. SHEPHERD, Parish Clerk	Blairgowrie	10
JOHN ANDERSON	Bo'ness	10
JAMES BARCLAY	Brechin	10
GEORGE MYERS	Broughty Ferry	5
JOHN R. GARVIE	Burntisland	9
WM. MACKENZIE	Cupar	11
JAMES REID	Coupar-Angus	8
GEORGE BOYD	Crieff	10
MARTIN WATTS	Deanston	10
ROBERT CORTEEN	Douglas, Isle of Man	4
ABR. MALCOLM	Dumfries	1
GEORGE GORDON	Errol	2
WM. GALLOWAY	Eyemouth	6
ALEX. NIMMO, Secretary	Falkirk	12
JO. SMITH, Secretary	Falkirk Joint-Stock	6
ANGUS M'PHERSON	Forfar	14
JAMES WHITE	Ferry-Port-on-Craig	7
ROBT. RODGER, Treasurer	Falkland	10
EMANUEL & SON	Hambro Gaslight Assoc.	2
WM. STIVENS	Inverness	9
THOS. MELDRUM	Kennoway	1
JAS. TOD, Secretary	Kettle	6
WM. NORRIE	Kincardine	7
J. ROBERTSON	Kinross	15
JOHN MICHIE	Kirkcaldy	25
JOHN CUTHBERT	Kirriemuir	14
ROBT. CARLOW	Linlithgow	11
AND. CANT	Leslie	20
THOS. CARMICHAEL	Leuchars	2
JOHN DANSKIN	Leven	10
ROBERT REDDIE	Markinch	9
JOHN REID	Montrose	15
ALEX. CRAIGHEAD	Newburgh	6
L. MUNRO	Nairne	2
G. W. WILSON	Prinlaws Mills	5
THOS. WHIMSTER	Perth	28
R. FORD	Perth New Gas Compy.	8
R. MORTLAND	Stranraer	9
DAVID LISTER	Strathmiglo	9
JOHN DOW	Stirling	22
J. MACFARLANE	Thurso	7
DAVID HUNTER	Tullibody	9

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CATHELS'S Patent Four-way Disc GAS-VALVE—ONE OF WHICH SERVES AS THREE ORDINARY VALVES—is the best Valve for gas-works.
For prices, &c., apply to the Manufacturers, Messrs. GUEST AND CHRIMES, ROTHERHAM.

CATHELS'S Patent Ribbed Gas Main-PIPES cost but about 1d. to 2d. per yard (depending on the size) more than Plain Pipes, and ensure PERFECT GAS-TIGHT CONNEXIONS with the Service-Pipes.
Apply to Messrs. BEGGS & SON, 37, Southampton Street, Strand, LONDON.

TESTIMONIAL.

Abingdon Gaslight and Coke Company, Limited, Offices and Works, Thames Street, June 25, 1868.

Mr. E. S. CATHELS.

Sir,—We have recently relaid a great portion of our town with your Patent Pipe, and I have much pleasure in bearing testimony to its merits. I find from our fitters that there is not the tendency to split when large services are put in that we find in the ordinary pipe of the smaller sizes, and, from having a greater thickness to drill and tap into, there is less liability to leakage at the connexion.

I am, sir, yours respectfully,
JOHN TOMKINS, Chairman.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

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PATENT GALVANIZED IRON COCKS,
WITH WHITE METAL PLUGS.
TRADE (L) MARK.

Warranted not to corrode or set fast, and are 50 per cent. cheaper than Brass Cocks.

THOMAS LAMBERT AND SONS,
Manufacturers,
SHORT STREET, LAMBETH, LONDON.

OXIDE OF IRON,
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.
FRANCIS RITCHIE & SONS,
BELFAST.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c. &c.
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

HENRY F. WILLEY,
(Manager for the late Mr. Vickary, of Exeter, 15 years,)
GAS ENGINEER AND CONTRACTOR.
WORKS: BARTHOLOMEW STREET, EXETER.

Improved Wet and Dry Meters. Gas Apparatus and Gas-Fittings Manufacturer.
Contractor for the Erection of Gas-Works, Gasholders, Station-Meters, Governors, and every article and apparatus appertaining to Gas-Works.

A GREAT SAVING OF TIME, LABOUR, & EXPENSE
IS EFFECTED BY THE USE OF
PRICE'S
PATENT COAL AND COKE BARROWS.

In addition to other testimonials the following has recently been received from one of the largest Gas Companies in London :—

London Gaslight Company, Nine Elms, May 18, 1868.

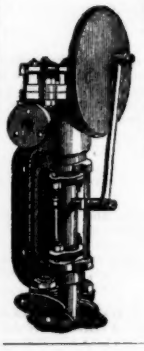
Dear Sir,—The Patent Coke Barrows are a great improvement, and a saving both in time and labour.
Yours truly, D. WATSON.

They are in use in the Government, Metropolitan, and several country Gas-Works.

Manufacturers for London and South of England—PRIEST & WOOLNOUGH, KINGSTON-ON-THAMES.
Manufacturers for the Midland Counties and North of England—
THE COALBROOKDALE COMPANY, NEAR WELLINGTON, SALOP.
Manufacturers for Ireland—J. EDMUNDSON AND CO., CAPEL STREET, DUBLIN.

Communications to be addressed to the Sole Agent, R. E. KEEN, 50, Claremont Road, Surbiton, S.W.; or either of the above.

ALEXANDER WILSON & CO., ENGINEERS,
VAUXHALL IRON-WORKS, NINE ELMS, LONDON, S.W.,
MANUFACTURERS OF
IMPROVED DONKEY PUMPS,
INJECTORS, SAFETY-VALVES, STOP-VALVES, AND BOILER MOUNTINGS OF EVERY DESCRIPTION.



Special attention is called to their New Improved Donkey Pumps, which are the best boiler feeders yet brought before the users of steam power. For boilers supplying steam to apparatus other than a steam-engine they are indispensable, and are rapidly supplanting the use of the feed-pump in the engine. They are also largely used in gas-works for pumping ammoniacal liquor, &c., in all parts of the world.

REDUCED PRICE LIST.
Those marked * are double-acting.

Size.	Diameter.	Stroke.	Gals. thrown per Hour.	H.P. of Boiler supplied.	Price.
No. 4	1¼ Inch.	2½ Inch.	150	10	£6 10 0
5	1½	3	230	15	8 10 0
6	1¾	4	460	30	11 0 0
7	2	4	600	40	13 0 0
*8	2¼	4	900	60	15 10 0
9	2½	6	1200	75	17 0 0
*10	2¾	6	1800	120	19 0 0

WOLVERHAMPTON RETORT WORKS.
ESTABLISHED **1840.**
JOHN EUNSON AND SON,
GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,
AND FIRE GOODS IN GENERAL,
WOLVERHAMPTON.
Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

1862.

PATENT ANTIMONY PAINT.
MADE ONLY BY
GEORGE HALLETT & CO.,
296, ROTHERHITHE, LONDON, S.E.

CLASS II.

This Paint having been in general use over seven years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (28s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs under 20s. per cwt., as compared with White Lead at 28s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

EDGE'S AMERICAN PATENT METHOD FOR SCURFING RETORTS.

The above improved method having been found to be the most efficacious, expeditious, and economical of any plan at present employed for the removal of the Incrustation from the interior of Retorts, arrangements have been made with the Patentee for working the patent in this country. Particulars and Terms for Licences may be had on application to

E. GODDARD, GAS-WORKS, IPSWICH,

Where the process may be seen in full operation.

ECONOMY IN GAS PURIFICATION.

Mc DOUGALLS'

HYDRATED PEROXIDE OF IRON.

This Oxide is now well known, and has gained at a number of the largest gas-works at home and abroad a decided preference for efficiency and durability. It is free from any mixture of sawdust or other material, every particle being available for use, thus causing the Purifiers to work double the time before it requires renewing, and saves one-third the cost of labour in charging them. It readily takes up sulphur, revivifies rapidly, and lasts longer than any other Oxide in the market. Prices on application to—

Mc DOUGALL BROTHERS, Manufacturing Chemists,

LONDON—11, Arthur Street West, London Bridge, E.C.; MANCHESTER—Riga Street, Shudehill.

BEST AND HOLDEN'S

PATENTS FOR CHARGING AND DRAWING GAS-RETORTS,

WITH CHAMBERS FOR MOUTHS,

REQUIRING NO LUTING.

Gas Engineers are solicited to examine into the merits of this invention before erecting new or altering old retort-houses. It may be seen in action at the Alliance Gas Company's Works, Dublin, where its utility and economy will be clearly demonstrated. Although the saving in labour will be considerable, and quickly return any outlay of capital, there are other and important features strongly recommending its adoption at all gas-works, and which a gas engineer upon examination will at once appreciate.

The Directors of the Alliance Gas Company have kindly consented to give every facility to gentlemen desirous of seeing the invention in operation. Parties, therefore, about to visit Dublin will be so good as to send us their card, and we will furnish them with letters of introduction.

Drawings, &c., may be seen at our Office, and all details explained.

JOHN CHISHOLM, SON, & CO., 44, MARK LANE, E.C.

TO CORPORATIONS, GAS ENGINEERS, AND OTHERS.

HENRY ALDER,

GRANGE METER-WORKS, EDINBURGH,

Begs to intimate that he is the ORIGINAL MANUFACTURER of

DRY GAS-METERS IN CAST-IRON CASES.

The Meters are protected by Registration on the 17th of December, 1864, under the "Copyright of Designs Act."

They are much more durable, and at the same time more easily repaired than those in Tin Cases.

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INVENTOR OF THE FIRST SUCCESSFUL

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210,000 IN USE.

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OBSTRUCTION OF THE HIGHWAY BY LAYING GAS-MAINS.

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A REPORT

Of the Arguments in and the Judgment of the Court of Chancery in the case of the

CAMBRIDGE UNIVERSITY AND TOWN GASLIGHT COMPANY

v.

CAMBRIDGE CONSUMERS GAS COMPANY LIMITED, AND OTHERS.

London: WILLIAM B. KING, 11, Bolt Court, FLEET STREET, E.C.

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Just Published, Fcap. 8vo., pp. 71, sewed, price 6d.,

ADVANTAGES of GAS in PRIVATE HOUSES.

A HANDY BOOK FOR GAS CONSUMERS: TELLING THEM WHAT TO DO, AND WHAT NOT TO DO.

BY J. O. N. RUTTER, F.R.A.S.

A new and revised edition, and the 196th thousand.

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For distribution by gas companies, the price is £12 12s. per 1000 copies, and £1 10s. per 100.

Crown 16mo, pp. 20,

GAS IN DWELLING-HOUSES: ITS USES, CONVENIENCES, AND ECONOMY.

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Price—1000 copies, £3 10s.; 500 copies, £1 17s. 6d., any smaller number at 8s. 6d. per 100.

When 1000 copies are ordered, the official title, scale of prices, and other information relating to the business of the Company, will be printed on the covers without extra charge.

All orders and inquiries for the last-mentioned edition to be addressed to the AUTHOR, Black Rock, BRIGHTON.

Mr. H. GORE,

CONSULTING GAS ENGINEER,

20, ALFRED PLACE, BEDFORD SQUARE, LONDON, W.C.

HOPKINS, GILKES, & CO.,

LIMITED,

MIDDLESBOROUGH,

SUPPLY GAS AND WATER PIPES OF EVERY SIZE,

Plain, Turned and Bored, and Coated.

CAST-IRON RETORTS.

Castings for Gas-Works of every description.

EXHAUSTERS.

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HARRIS AND PEARSON,

STOURBRIDGE.

PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY.

MANUFACTURERS OF

FIRE-BRICKS, GAS-RETORTS, AND FIRE-CLAY GOODS OF EVERY DESCRIPTION.

Orders of any magnitude, for home and exportation, executed with all possible despatch.

N.B.—A quantity of Retorts in stock.

Circulars, 15 in. and 16 in. Ovals, 20 in. by 14 in.

D's, 15×13, 16×12, 18×14, 20×16, 21×14, 24×14.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

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FIRE-BRICKS, LUMPS, SQUARES, and TILES of all dimensions.

GAS-RETORTS always in stock.

GARDEN EDGINGS of various patterns.

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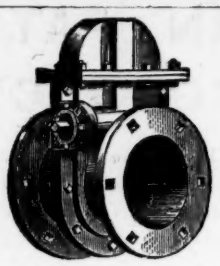
GRATE BACKS in various designs.

Contracts entered into to set Retorts, erect Furnaces, &c.

Shipments on the shortest notice.

Makers of A. C. FRASER'S Patent Ribbed Retorts and Brick Ovens.



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from 9 inches to 18 inches, price 9s. 6d. to 12s. per inch diameter

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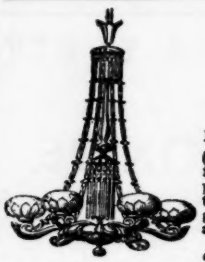
These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.

Valves made with Outside Racks to order. Also, Screw Water-Valves with Gun-Metal Faces.

B. DONKIN & CO.,

ENGINEERS,

NEAR GRANGE ROAD, BERMONDSEY.



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45, OXFORD STREET, LONDON;

Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of GAS in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

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159, GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

Sole Manufacturer of PADDON'S PATENT STREET-LAMP REGULATORS, for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

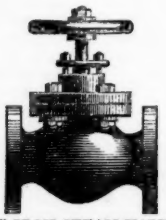
MATHER AND PLATT,

SALFORD IRON-WORKS, MANCHESTER,

Beg to call attention to their Revised List of Prices of VALVES, TAPS, &c. They also request the notice of Water Companies and Hydraulic Engineers to their IMPROVED SLUICE-VALVES for Water. The Slides have Gun-Metal Facings, are of wedge form, and when screwed down are tight on both sides.

GUN-METAL TAPS.

Bore.	Price.
¾ inch	£0 4 0
½ ,,	0 4 6
¾ ,,	0 6 0
1 ,,	0 8 6
1¼ ,,	0 11 0
1½ ,,	0 14 0
1¾ ,,	0 18 0
2 ,,	1 2 6



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Bore.	Price.
2 inches	£1 2 6
3 ,,	1 17 6
4 ,,	2 15 0
5 ,,	3 15 0
6 ,,	4 17 0
7 ,,	6 0 0
8 ,,	7 5 0
9 ,,	8 15 0
10 ,,	10 10 0
11 ,,	12 5 0
12 ,,	14 0 0

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Bore.	Price.
2 inches	£1 10 0
3 ,,	2 5 0
4 ,,	3 0 0
5 ,,	3 16 0
6 ,,	4 14 0
7 ,,	5 14 0
8 ,,	6 16 0
9 ,,	8 0 0
10 ,,	9 6 0
11 ,,	10 14 0
12 ,,	12 4 0

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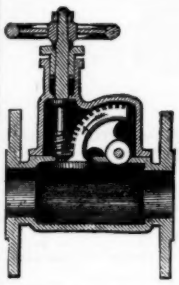

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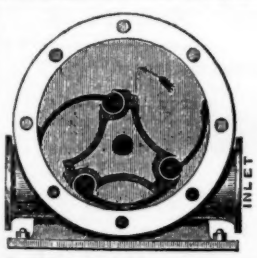

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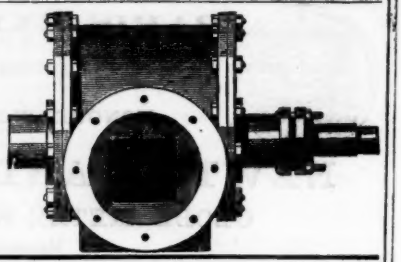

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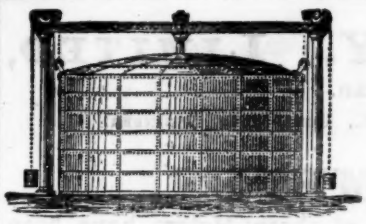

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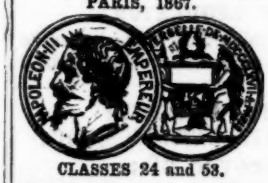

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